

# Sexually Transmitted Infections Epidemiology

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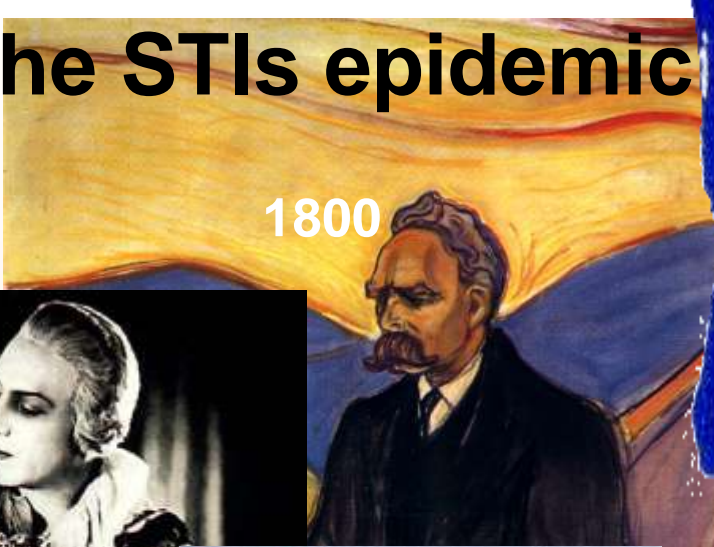
Training Course in Sexual and Reproductive Health Research  
Geneva 2010



# Outline

- Introduction, Slides: 3 - 6
- Global and Regional STI Burden, Slides: 7 - 28
- STI Epidemiology: country specific examples, Slides: 29 - 43
- STI epidemiology: populations, transmission, risk, Slides: 44 - 46
- WHO STI Library, Slides: 47 - 50

# ... and, since BC, the STIs epidemic



1800



1700



1900

2003



1500



1968

2002



2003



FOLHA IMAGEM

# Sexually Transmitted Infections, STIs

There are about **30 STIs** or disease syndromes that result from STIs

# STIs

## Bacteria

- Gonorrhea (*Neisseria gonorrhoeae*)
- Chlamydia (*Chlamydia trachomatis*)
- Syphilis (*Treponema pallidum*)
- Chancroid (*Haemophilus ducreyi*)

## Viruses

- Genital warts and cervical—mainly--cancer (human papillomavirus)
- Genital herpes (herpes simplex virus)
- Hepatitis B (hepatitis B virus)

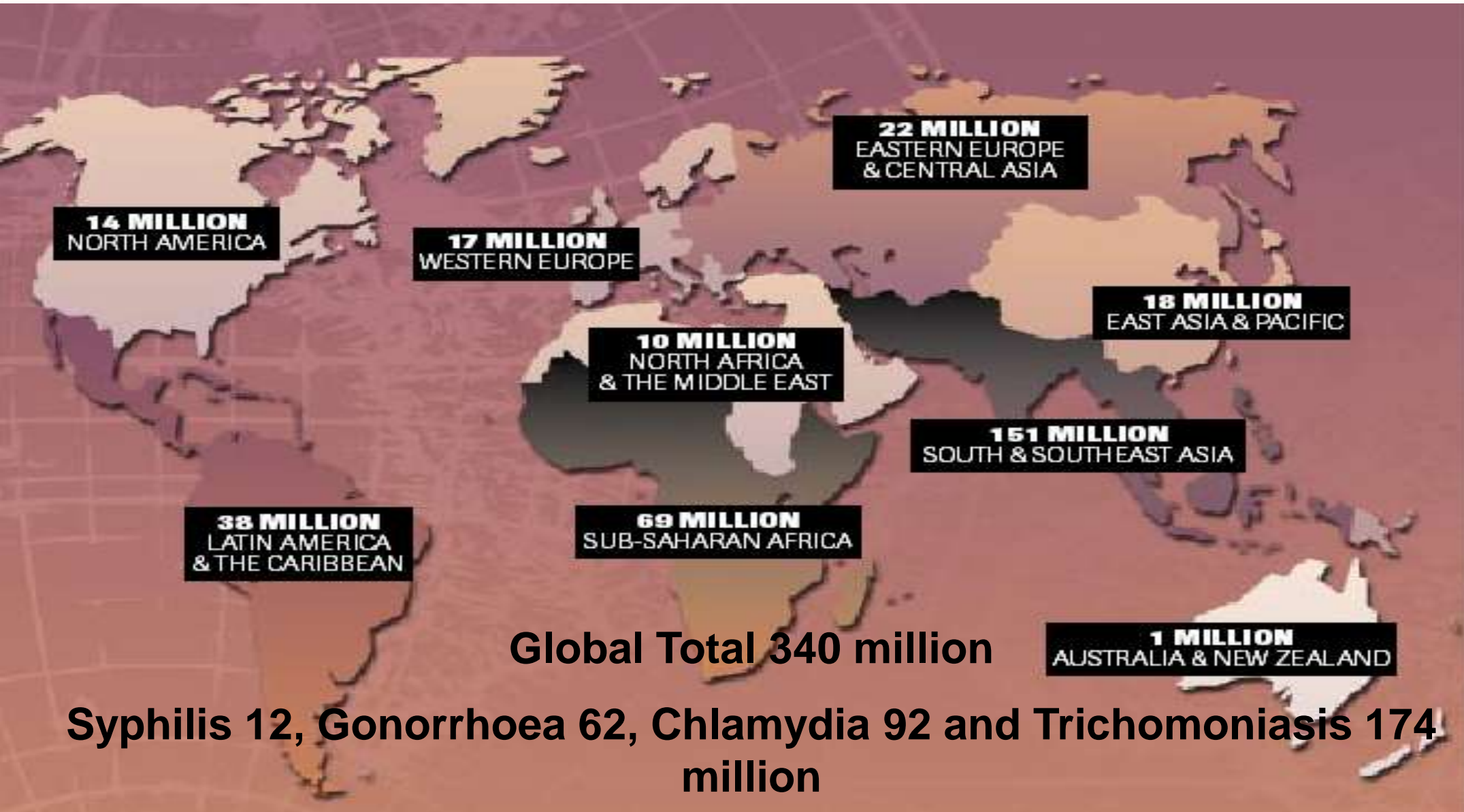
## Parasites

- Trichomoniasis (*Trichomonas vaginalis*)
- Pubic lice (*Phthirus pubis*)

# Since the 80's: HIV, the new, devastating, STI



# Estimated new cases of curable STIs among adults, 1999



# STI Global Burden

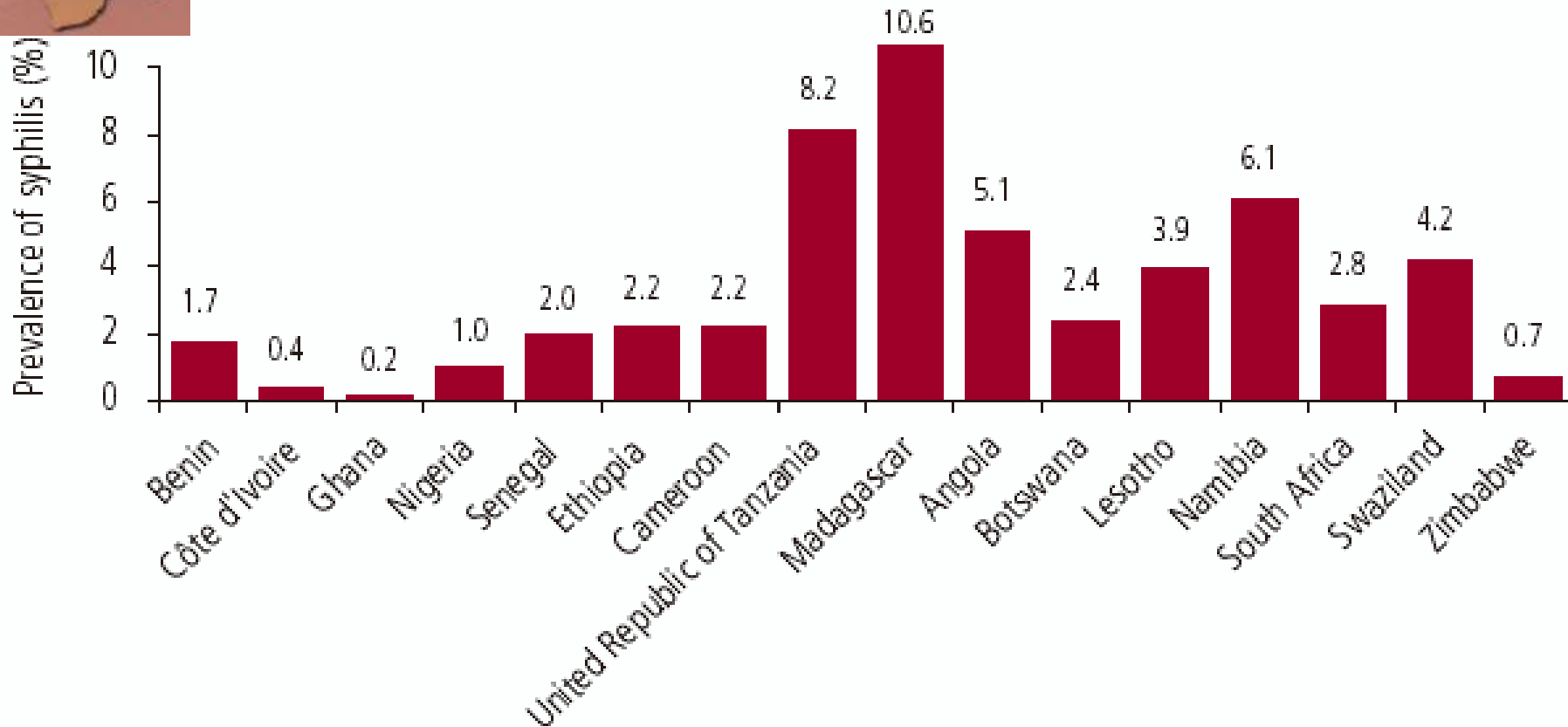
Global estimates of incidence and prevalence of selected sexually transmitted infections: *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, Syphilis, and *Trichomonas vaginalis*, 2005, will be available soon.

visit RHR at: <http://www.who.int/reproductive-health/>  
visit WHO at: [www.who.int](http://www.who.int)





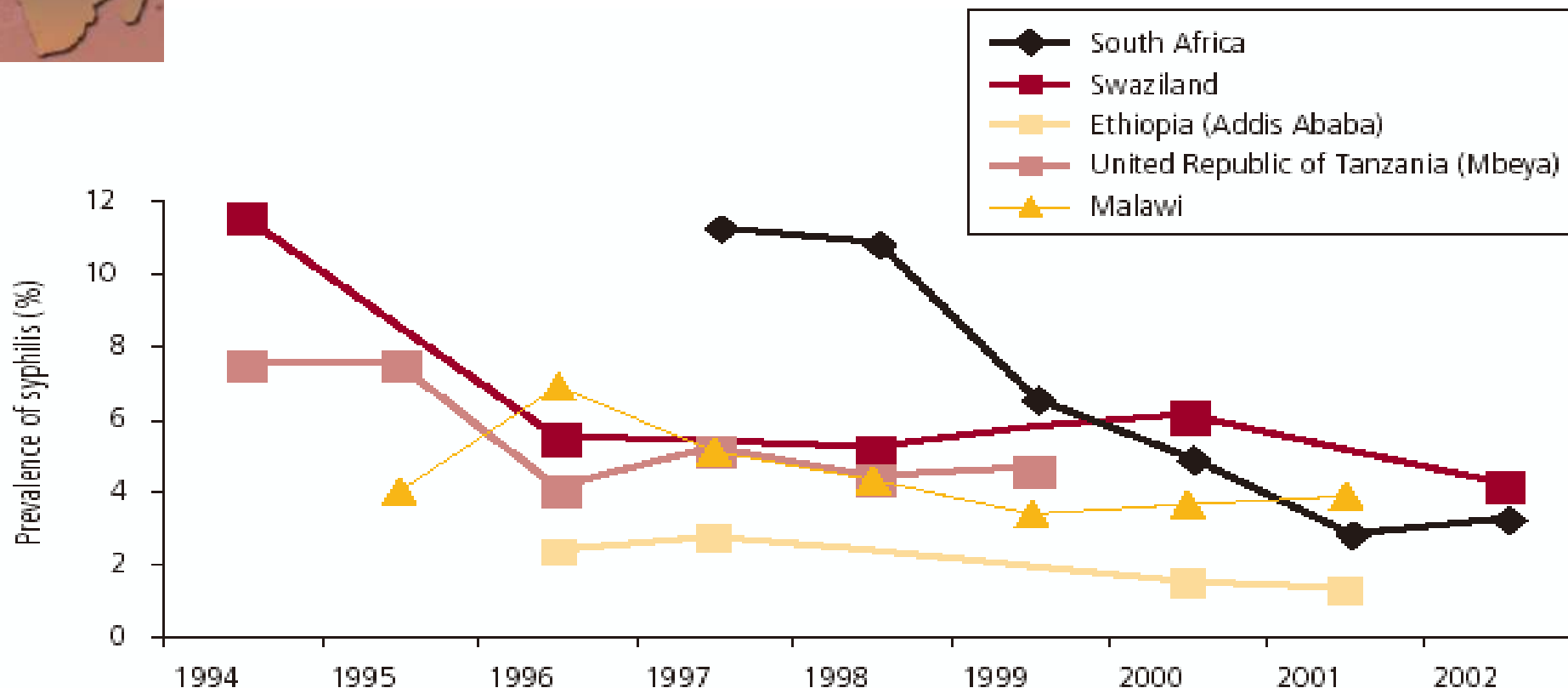
# Prevalence of syphilis among women attending antenatal care clinics at selected sites, by country, 2000 - 2002



Source: HIV/AIDS Epidemiological Surveillance Update for the WHO African Region: 2002

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# Trends in prevalence of syphilis among attending antenatal care clinics at selected sites, by country, 1994 - 2002



Source: HIV/AIDS Epidemiological Surveillance Update for the WHO African Region: 2002

# We Really Do Not Know How Common Congenital Syphilis Is

We Rely on Estimating the Numbers of  
Pregnant Women with Syphilis

And Multiply That By Estimating the Proportion  
of These Women with an Affected Fetus/Infant

# Use of Maternal Syphilis Seroprevalence Data to Estimate the Global Morbidity of Congenital Syphilis

- Identified all published reports of syphilis seroprevalence in pregnant women, 1997-2003
- Constructed region-specific prevalence rates for maternal syphilis
- Using three models of the proportion of these women with an affected fetus/infant, to estimate the number of foetuses/infants infected

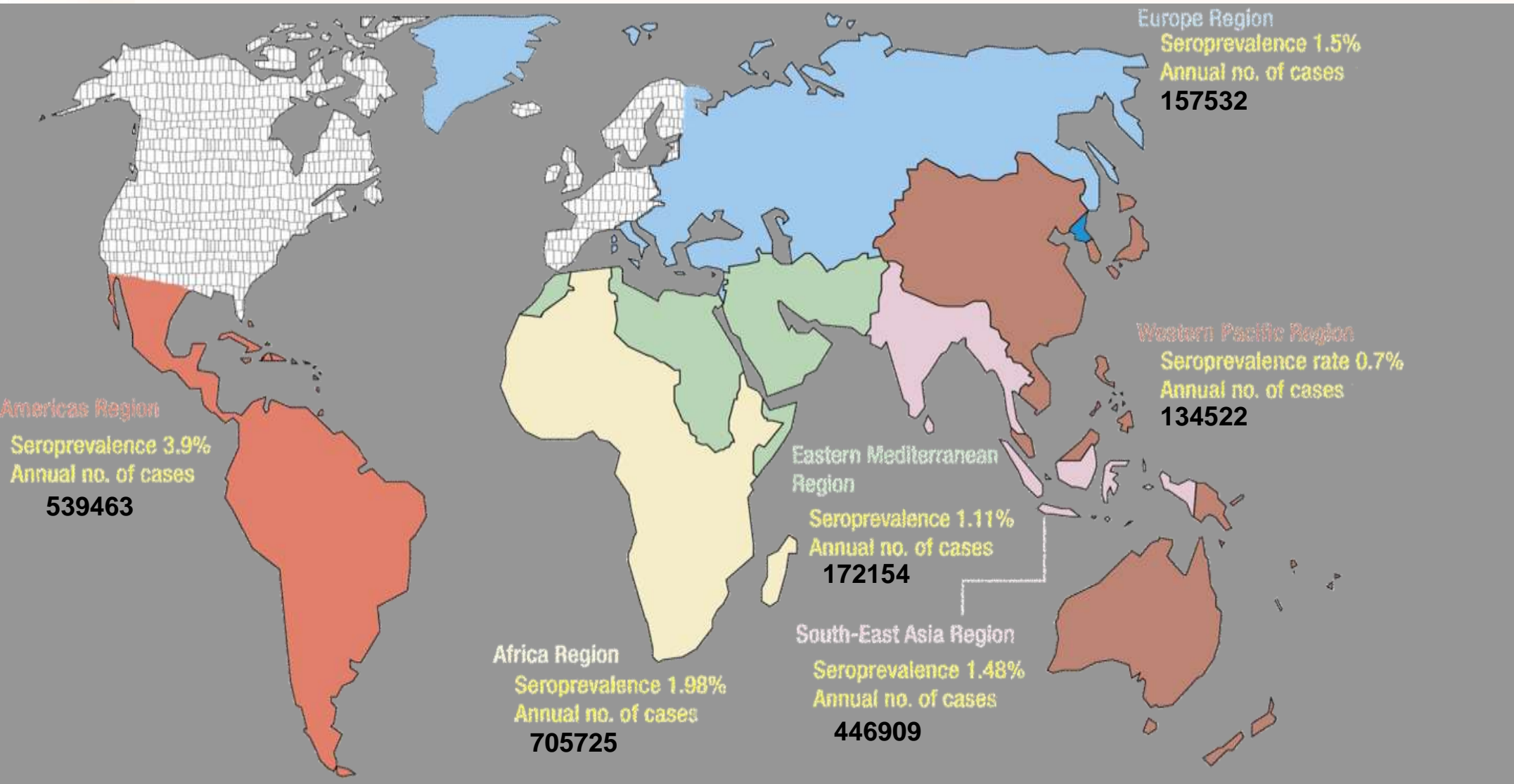
*Schmid GP, Stoner BP, Hawkes S, Broutet N. Sex Transm Dis (June 2007)*

# 2005 WHO Estimates of maternal syphilis seroprevalence

- Data from studies done between 1997 – 2003:
  - 215 studies
  - 31 countries
  - total 431,452 women tested
- Overall prevalence was 1.76%.
- Estimation of 2,156,304 women with positive syphilis serology using regional estimate
- 95% CI= 1,559,888 - 2,751,032

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# Regional Estimates of Maternal Syphilis Seroprevalence



	<b>More Conservative Watson-Jones<sup>1</sup> 2002</b>	<b>Mid Range Schulz 1987</b>	<b>Less Conservative Global Burden of STI<sup>3</sup> 2000</b>
<b>Proportion of seropositive women with:</b>			
A. Untreated syphilis	0.95*	1.0	1.0
B. High serologic titer (≥1:8)	0.73	--	--
C. Adverse pregnancy outcome due to syphilis**	0.49	0.65	0.75
<b>Global Annual No. of Congenital Syphilis Cases (calculated as 2.1 million maternal cases x A x B x C)</b>	<b>713,600</b>	<b>1,365,000</b>	<b>1,575,000</b>
		Watson-Jones D et al. J Infect Dis 2002;186:940	<sup>2</sup> Schulz K et al Genitourin Med 1987;63:320 <sup>3</sup> WHO (www.who.int)

\* not included in original Watson-Jones model

\*\* includes miscarriage / fetal loss, perinatal death, prematurity / low birthweight, neonatal infection

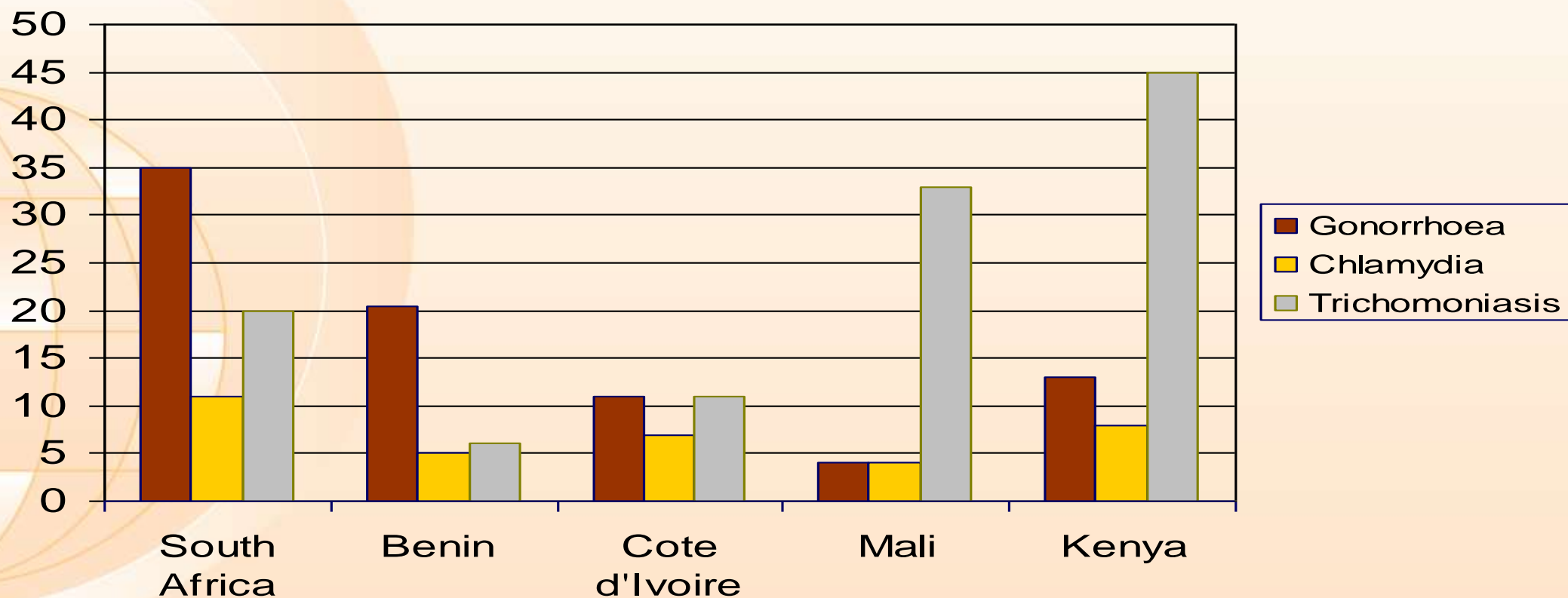


A stylized globe graphic with orange and white grid lines, positioned on the left side of the slide.

# **While Numbers Vary, and Estimates are Estimates, the Numbers of Women and Children Infected are "High"**

**In many parts of the world, syphilis is common**

# Prevalence of Gonorrhoea, Chlamydia and Trichomoniasis among FSW, at selected sites, by country, 1997-2000



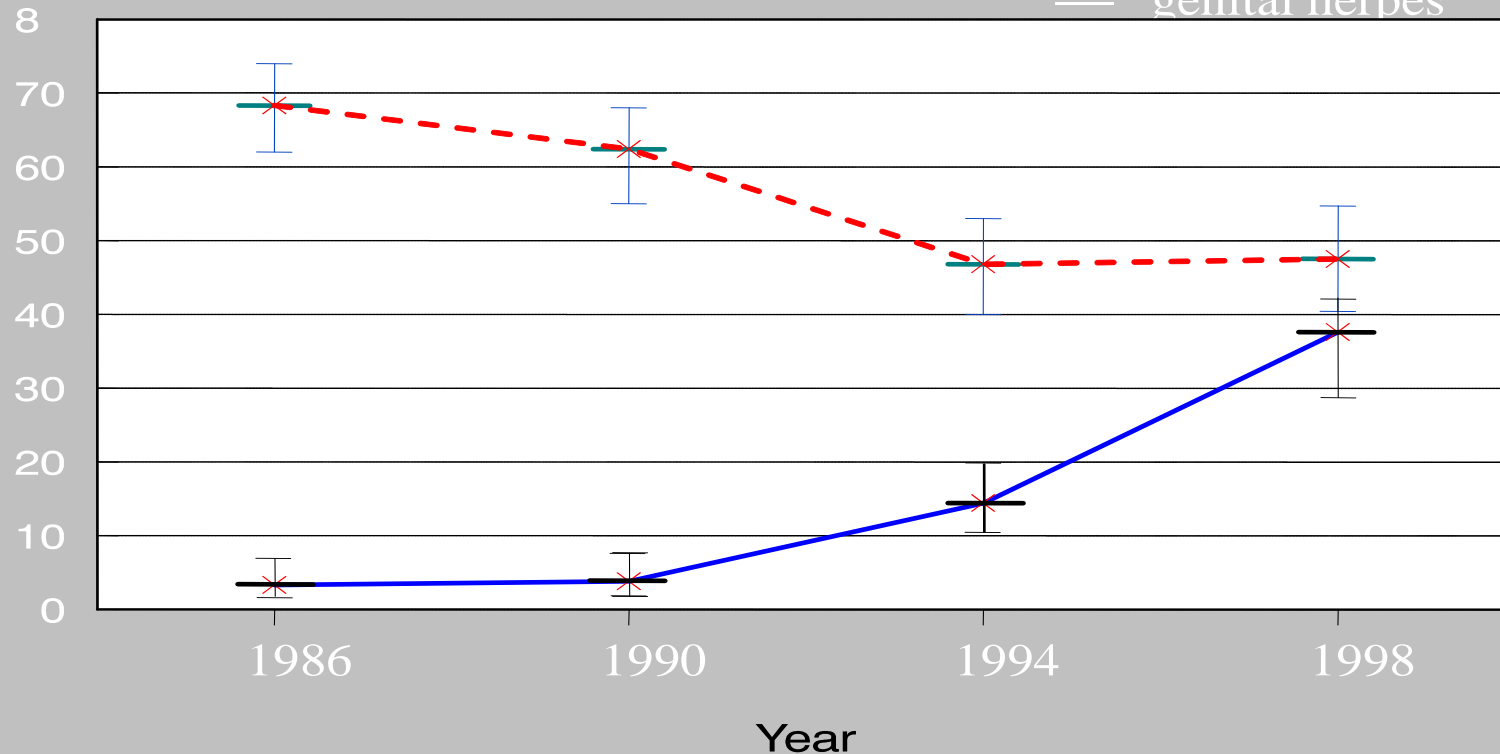
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# Aetiology of Genital Ulcer (Chancroid and Genital Herpes) by year of study in South Africa



Proportion

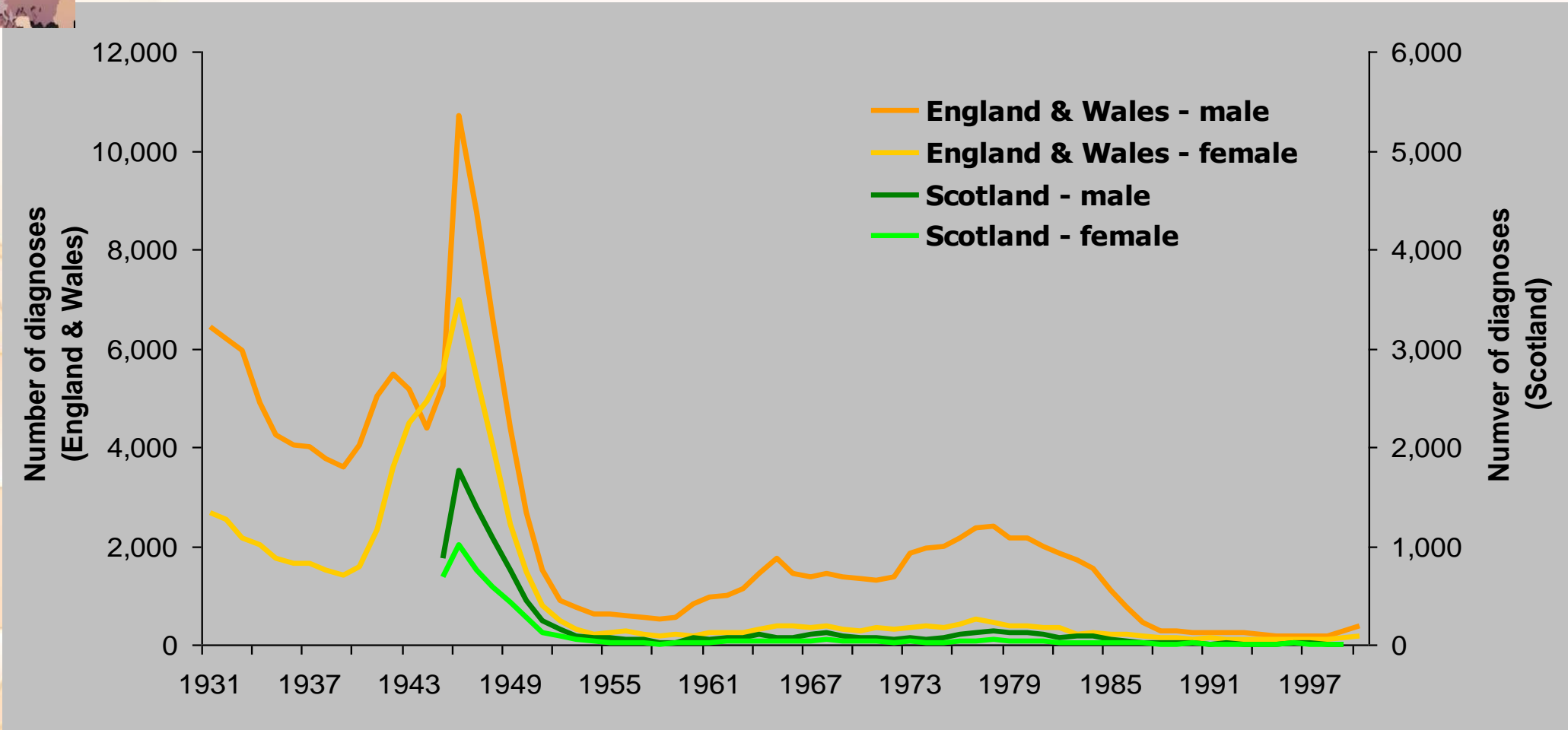
---- chancroid  
— genital herpes



Source: WHO, Report of an Expert Consultation on Improving the Management of Sexually Transmitted Infections, 2001

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# Diagnoses of syphilis (primary, secondary and latent in the first 2 years of infection) seen in GUM clinics, England, Scotland# and Wales, 1931 to 2000\*



Source: PHLs, UK

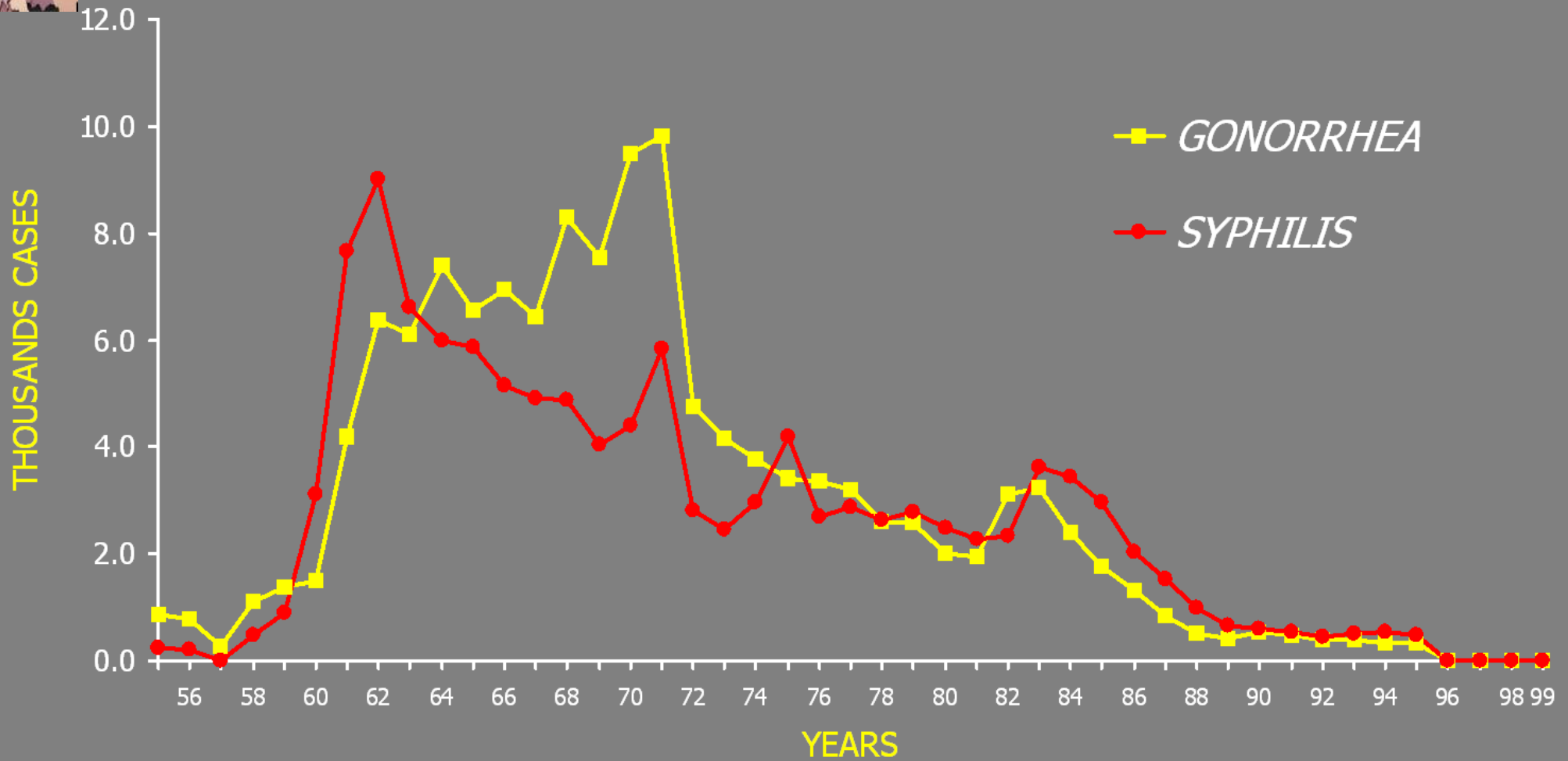
# Equivalent Scottish data are not available prior to 1945 and for 2000

\*As Northern Ireland data from the time period 1931 to 2000 are incomplete they have been excluded from this figure



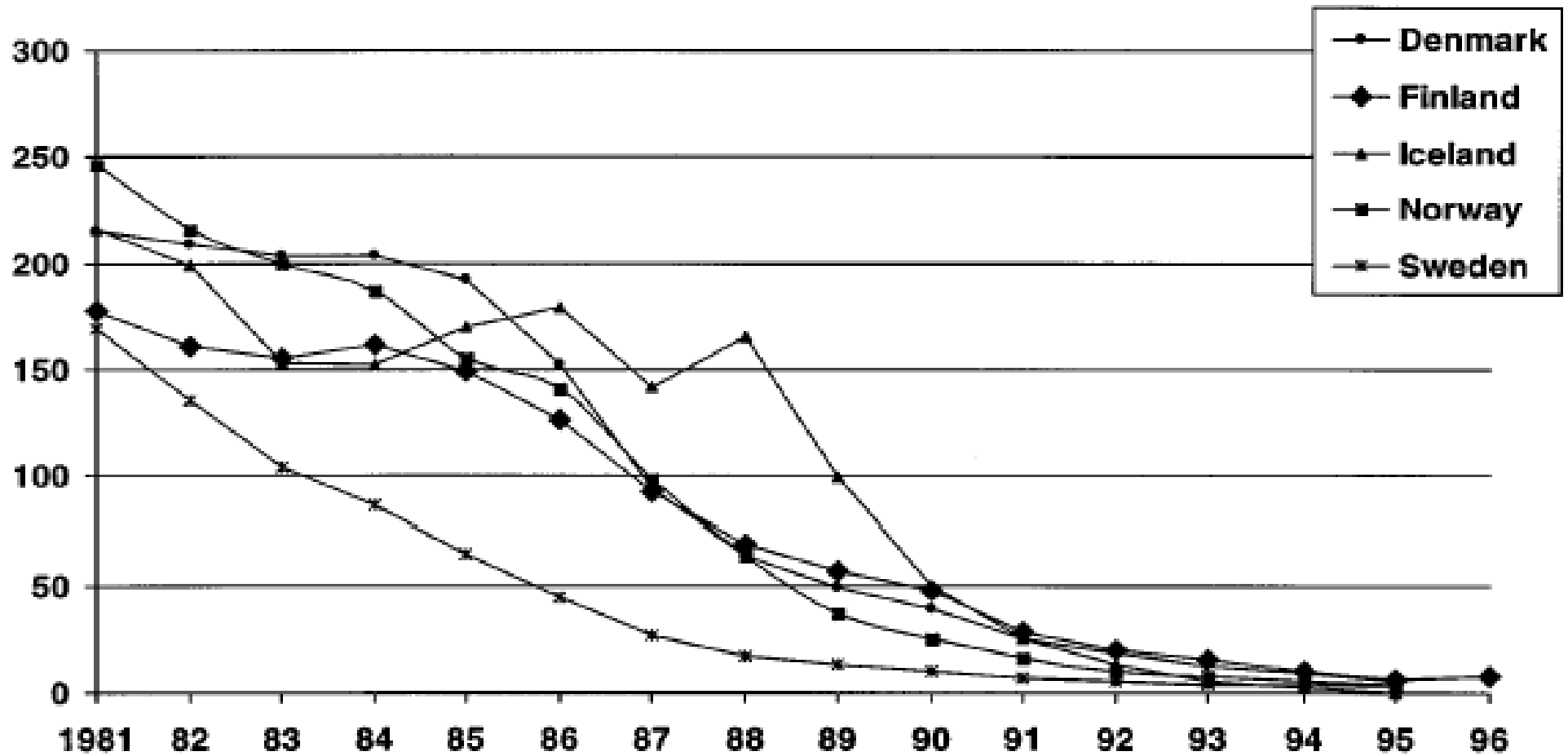
# Gonorrhoea and syphilis in Italy

## Mandatory notifications, 1955-1999



Source: Suligo et al.

# Annual incidence of gonorrhoea per 100 000 population in Nordic countries (1981 – 1996)



Source: Adler, Meheus, *JEADV* 2000;14:370 - 377

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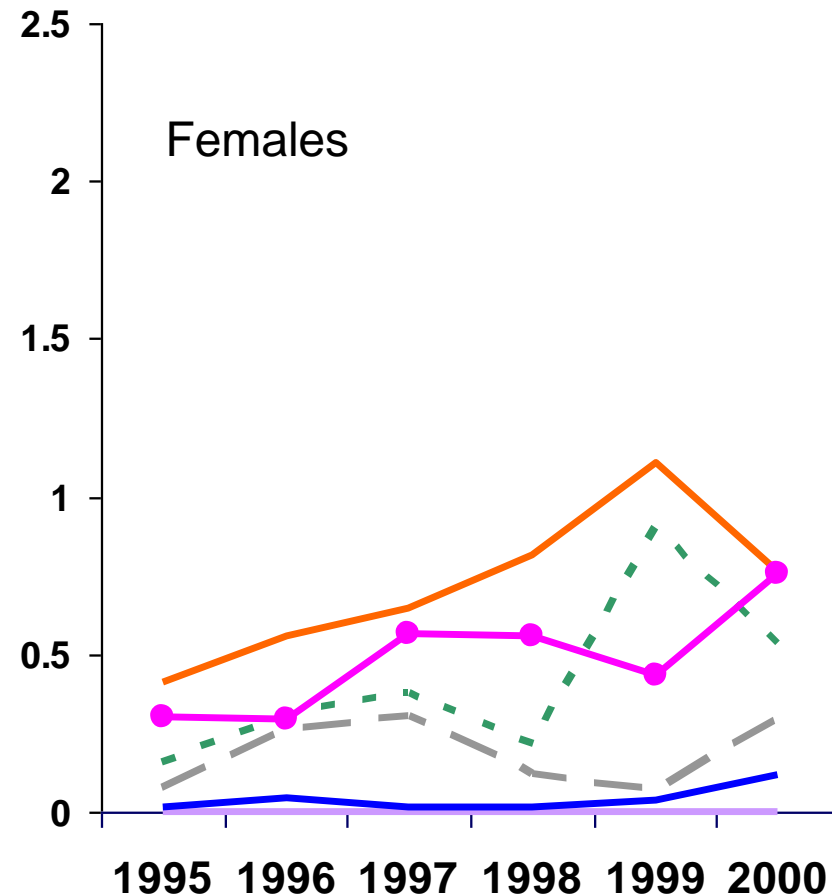
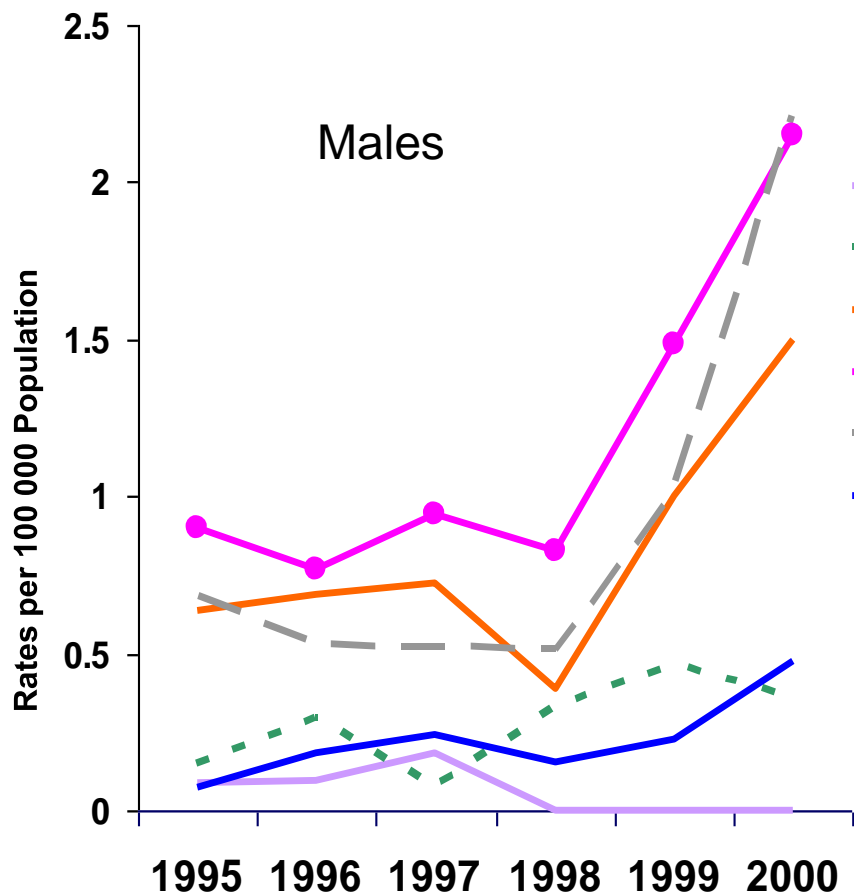
# The STI Epidemic, Europe and Central Asia



Late 1990s  
Things are not the same anymore!

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# Diagnoses of infectious syphilis (primary and secondary) in GUM clinics by sex and age group, UK: 1995-2000\*



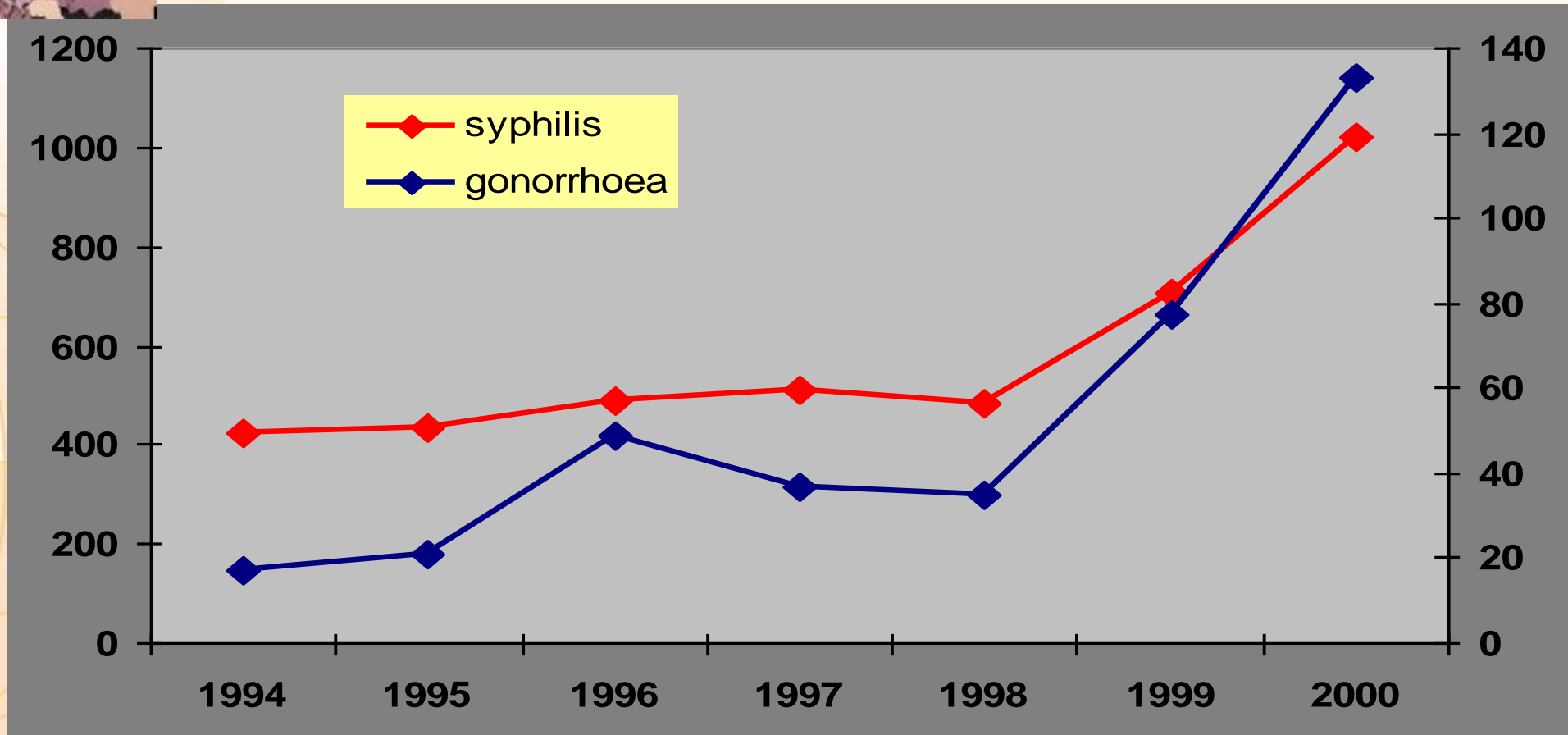
\*Data are unavailable from Scotland for 2000 and from N.Ireland for 1996 & 1997

Source: ESSTI/PHLS, UK

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# Netherlands: Gonorrhoea and syphilis, STD clinic Amsterdam (annual reports, GG&GD Amsterdam).

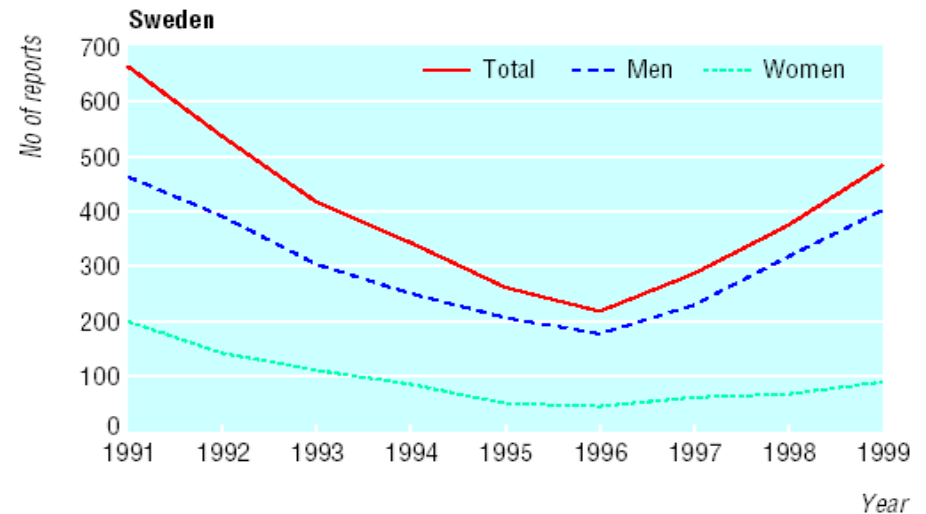
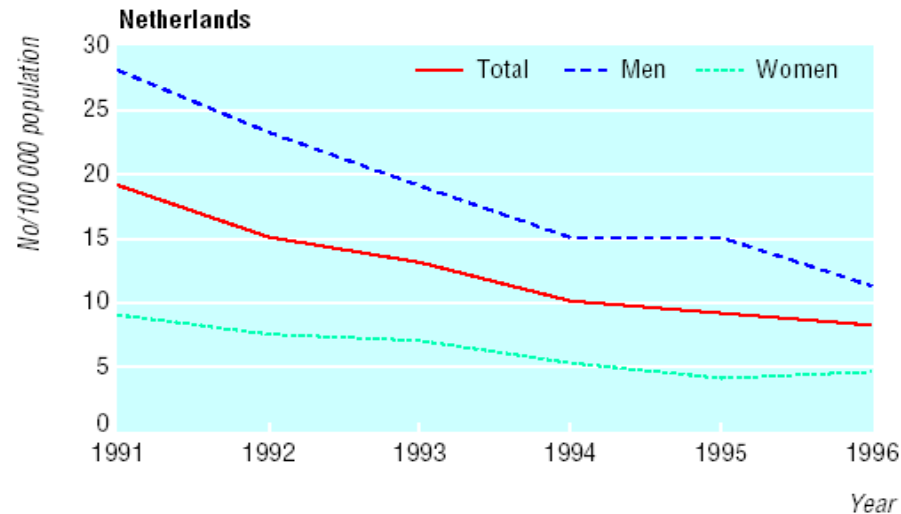
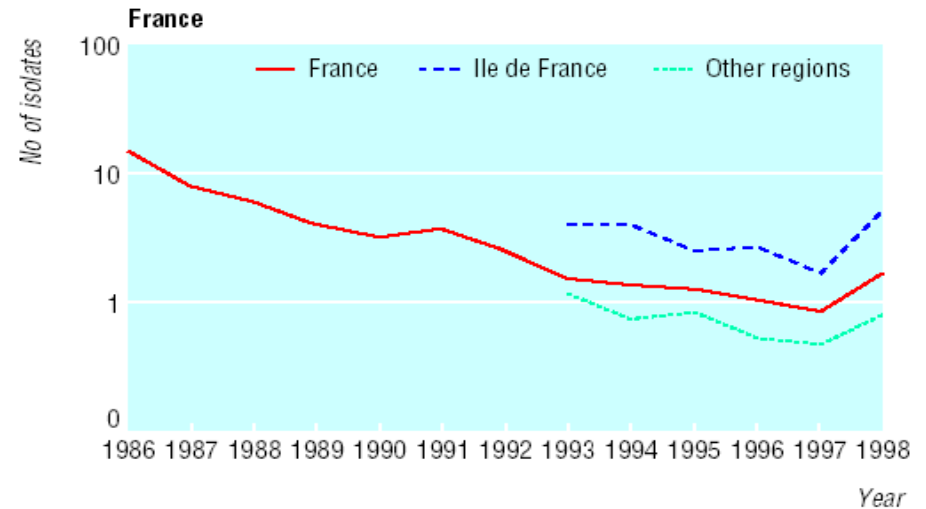
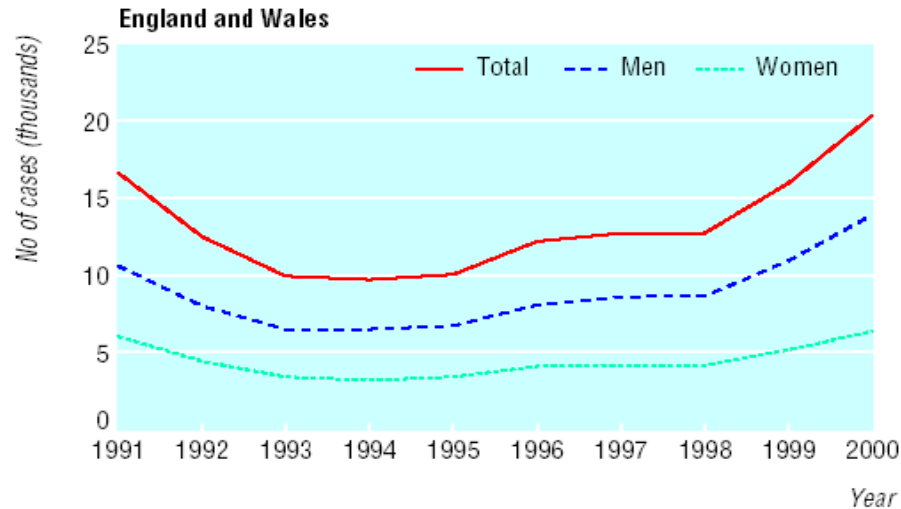


GO: 1999: + 46%; MSM 59% heter 16% fem 66%; 2000: + 45%; 33% 56% 72%  
 Lues: 1999: + 120%; MSM 333% heter 54% fem 40%; 2000: + 63% (MSM 136%)

Source: ESSTI/PHLS, UK

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# Trends in gonorrhoea in England and Wales, France, the Netherlands, and Sweden



**SOURCES:**

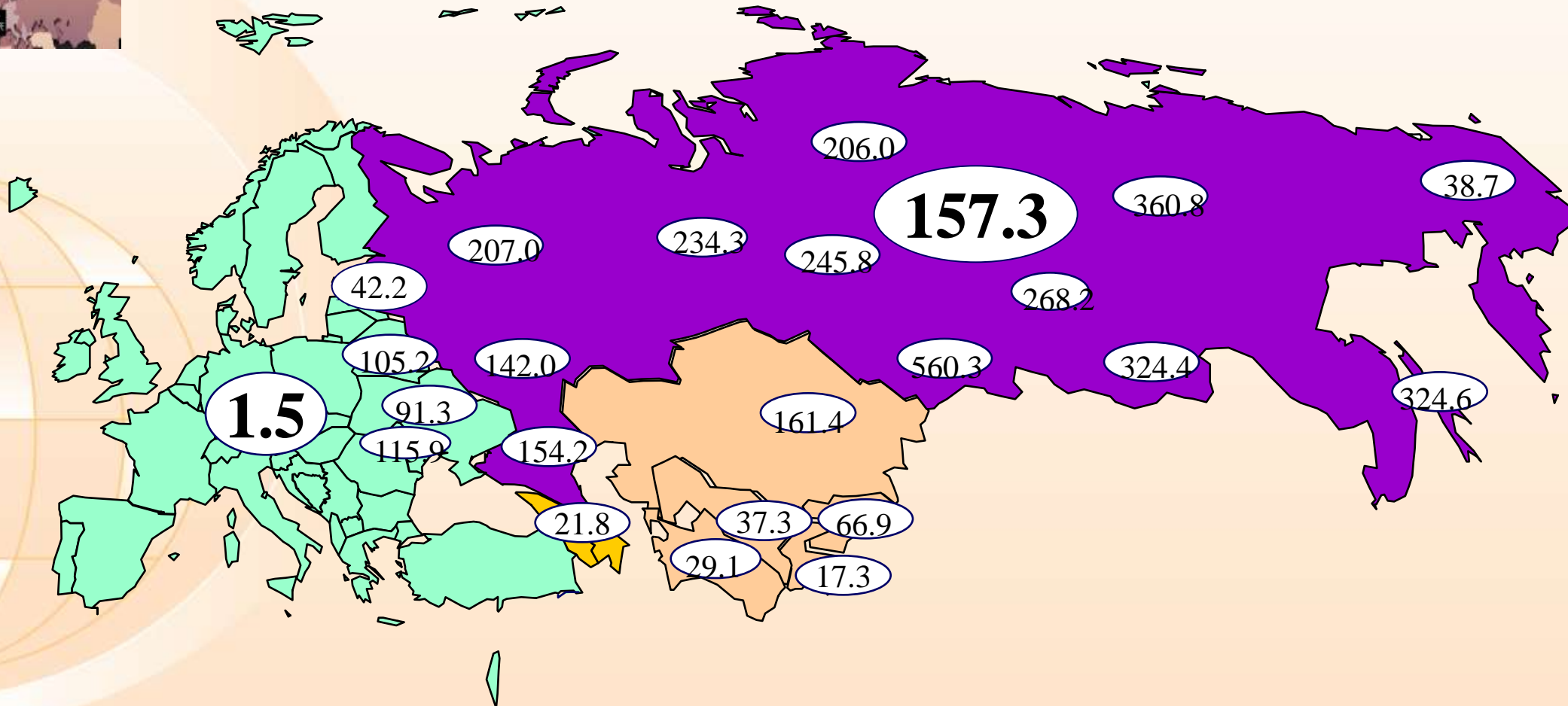
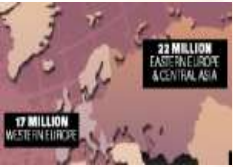
England and Wales: cases of gonorrhoea seen in GUM clinics, 1991-2000; France: trends in gonococcal infections in RENAGO laboratories, 1991-9  
 Netherlands: notified cases of gonorrhoea per 100 000 inhabitants, 1976; Sweden: number of clinically reported *Neisseria gonorrhoeae* cases, 1991-99 (adapted from Smittskyddsinstitutet (Swedish Institute for Infectious Disease Control), *Smittsamma Sjukdomar 1999*. Stockholm: Smittskyddsinstitutet, 2000)

Source: Nicoll & Hamers, *BMJ* 2002;324:1324-7

# Incidence of syphilis in the WHO EURO Region 1999/2000

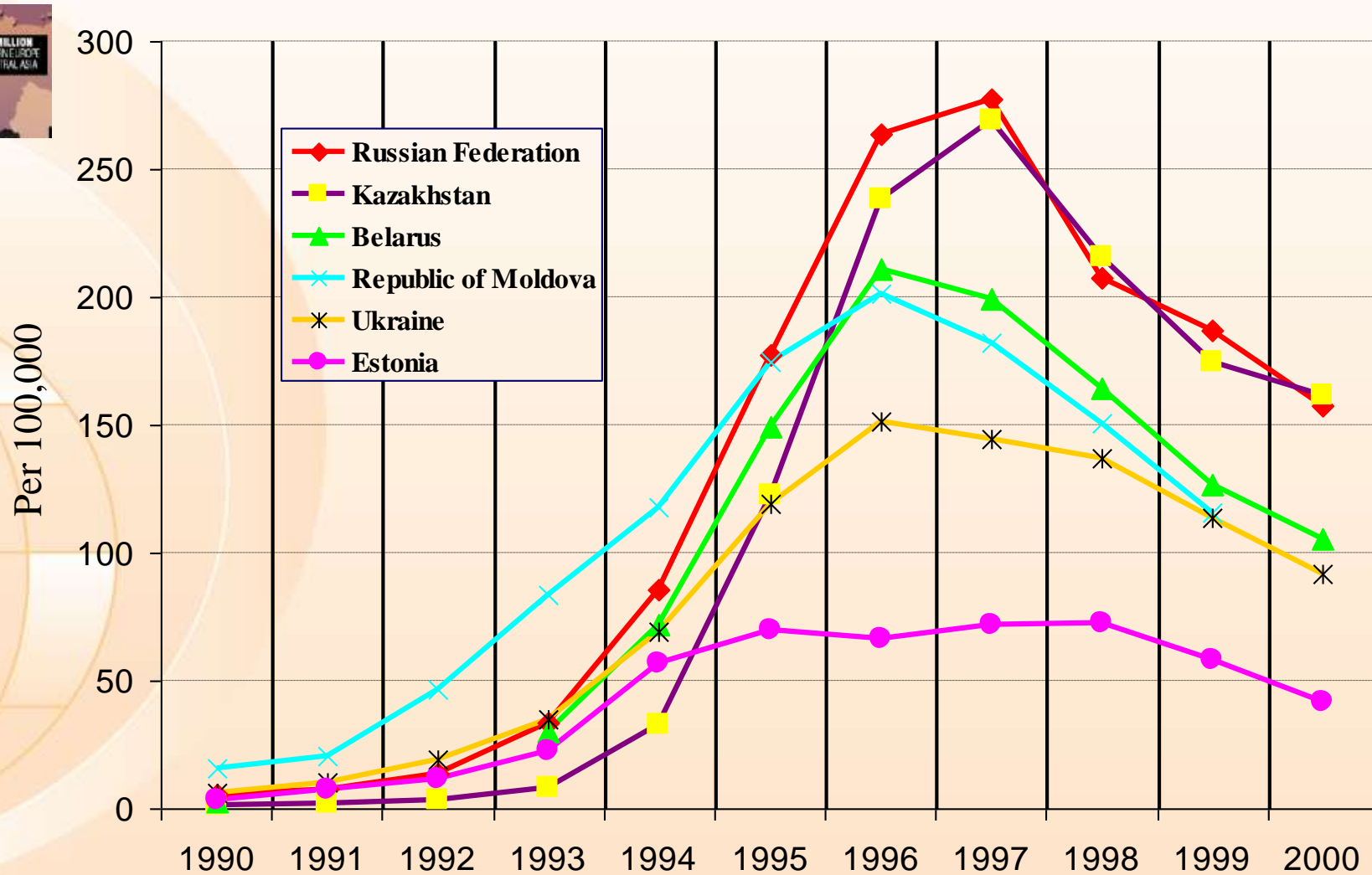
## Rate per 100,000 population

- Different Magnitude of Problem -



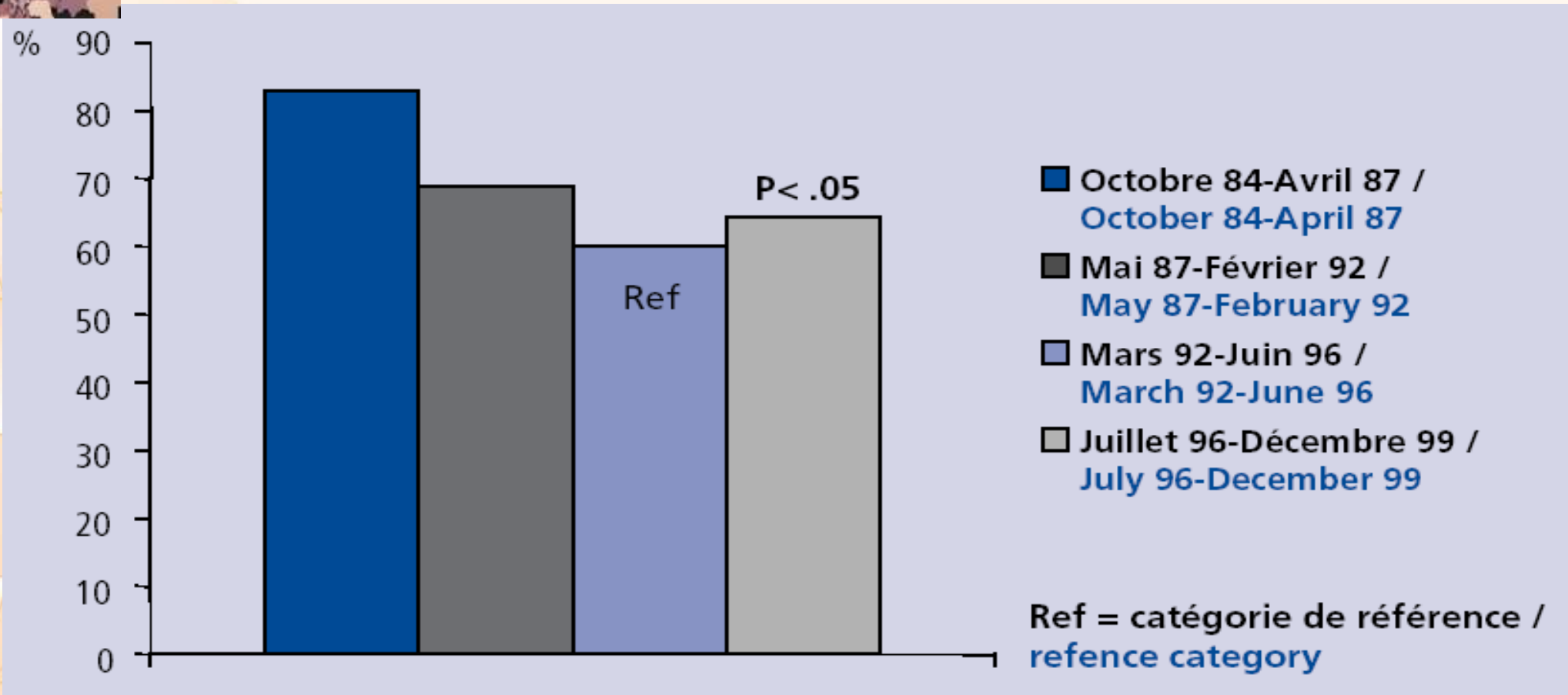
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# Incidence of syphilis in Belarus, Estonia, Kazakhstan, Moldova, Russia, Ukraine, 1990-2000 (rate per 100 000)



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# Percentage of unprotected anal intercourse among HIV-negative young (< 35 years) homosexual men (n=877), Amsterdam, 1984-1999



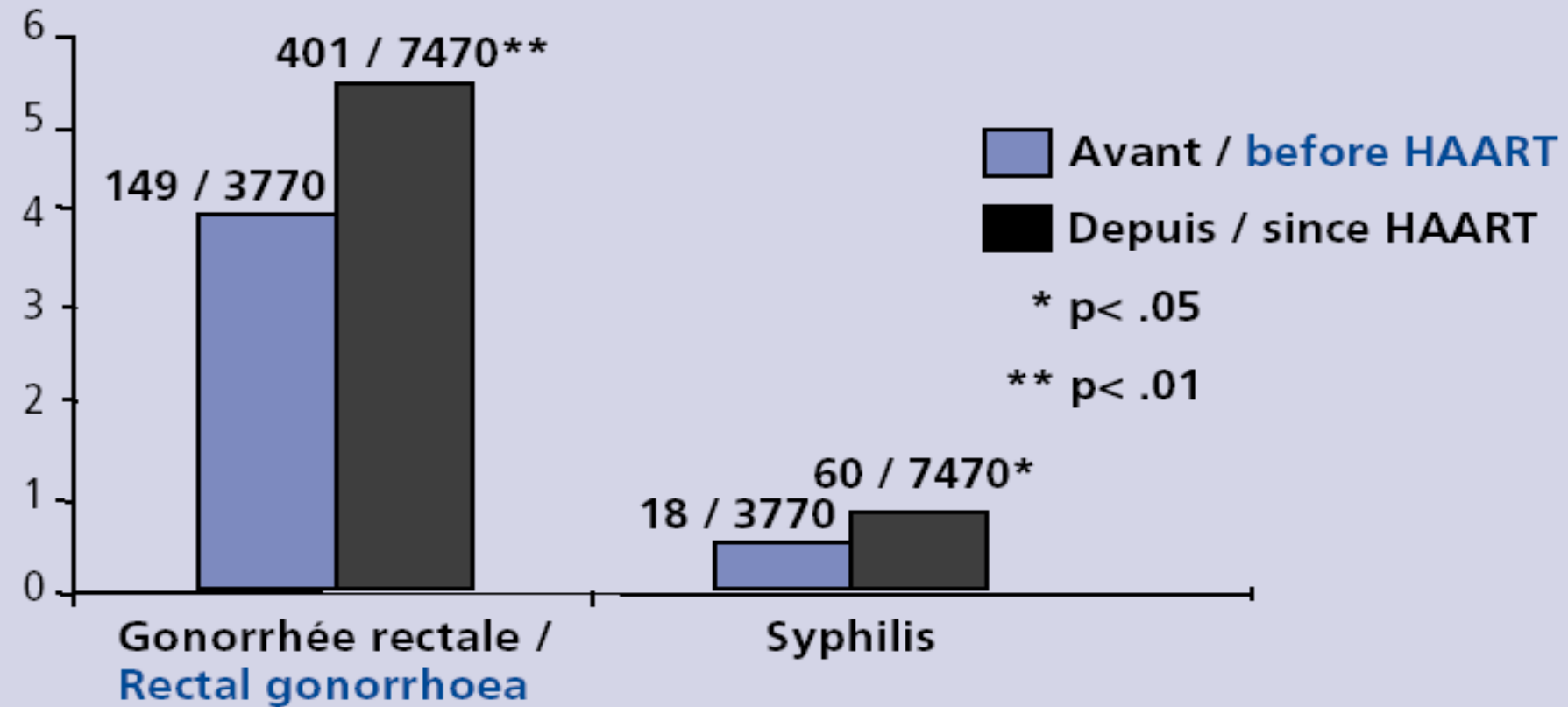
Source: Stolte et al. EUROSURVEILLANCE Vol. 7 No2 FEBRUARY 2002

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# Relative numbers (infection rate) of rectal gonorrhoea and early syphilis diagnosed among homo- and bisexual men before and after the introduction of anti HIV therapies, Amsterdam STD outpatients clinic, 1994-1999



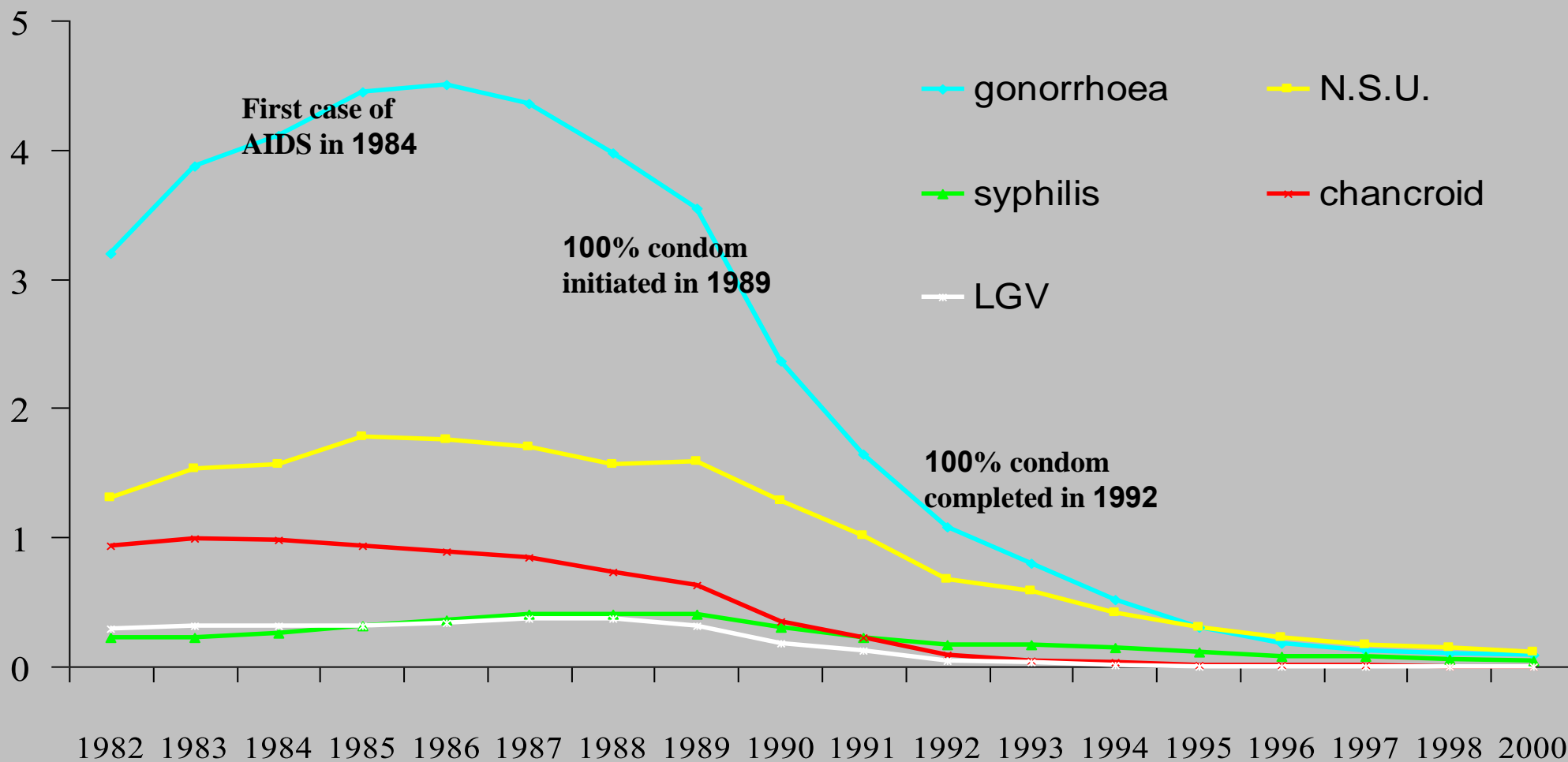
Taux d'infection / Infection rate (%)



Source: Stolte et al. EUROSURVEILLANCE Vol. 7 No2 FEBRUARY 2002

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# Incidence of STDs in Thailand (1982-2000)



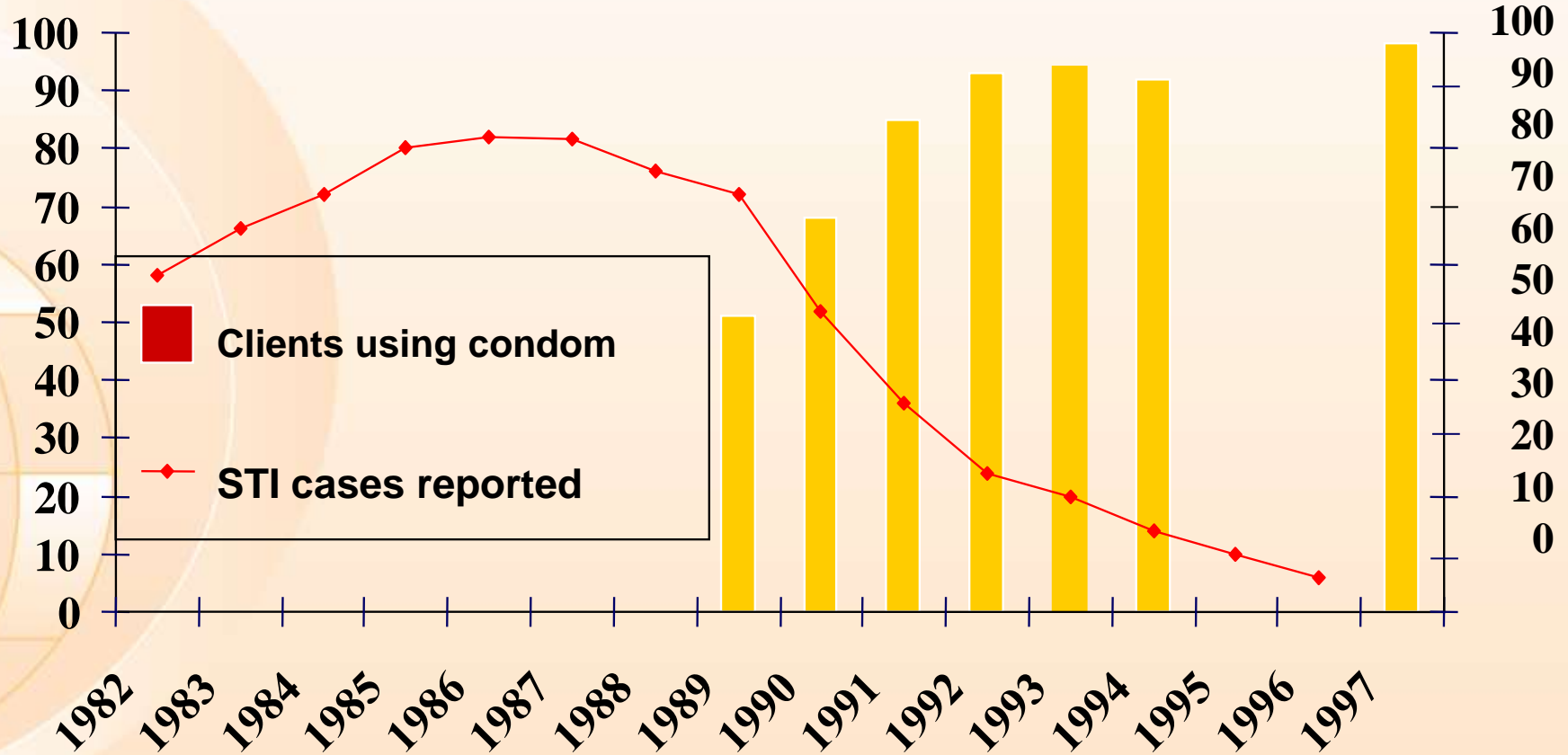
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# Clients Using Condoms and STI Cases Reported - Thailand



STI cases reported ( thousands)

% using condoms



Source: Sentinel Serosurveillance, Division of Epidemiology, Ministry of Public Health.



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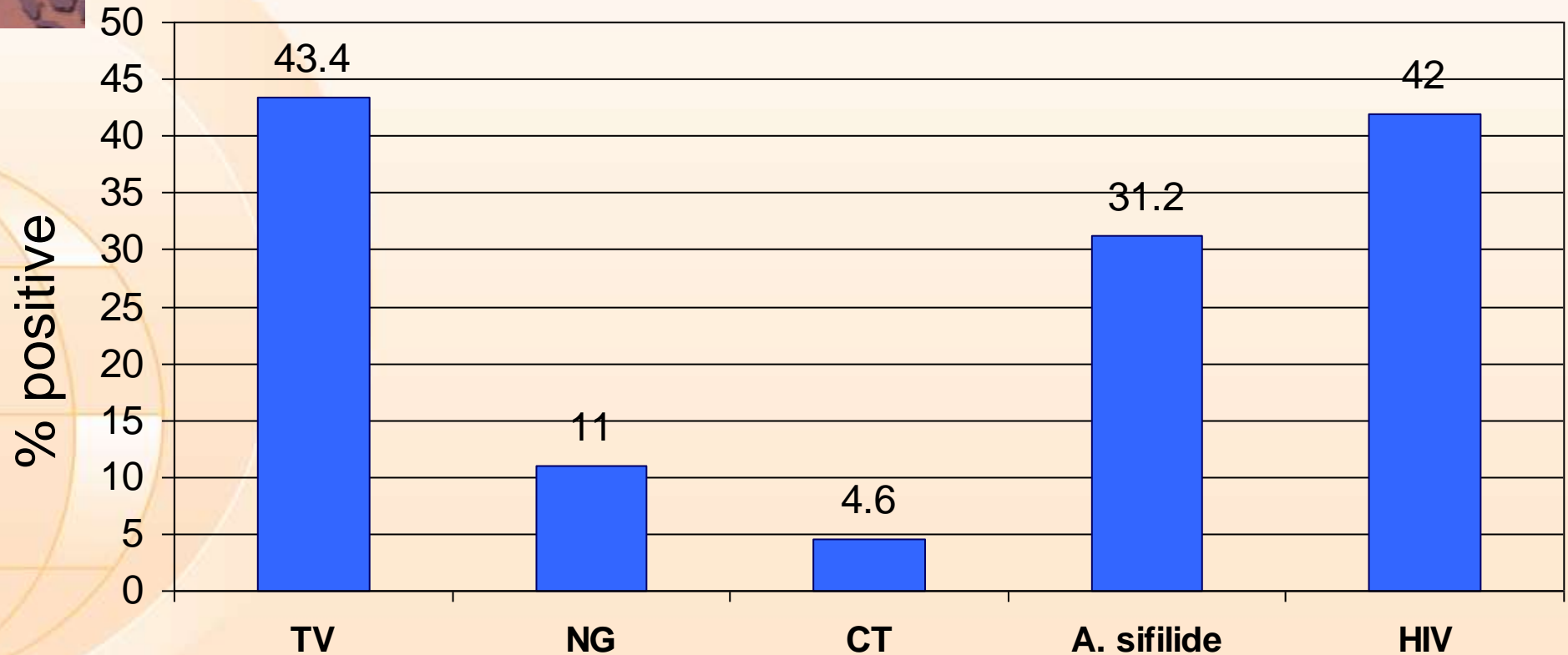
# Prevalence of Syphilis in pregnancy (Thailand)



<b>1963</b>	<b>9.70</b>	<b>Moph</b>	<b>1992</b>	<b>1.48</b>	<b>Moph (District)</b>
<b>1965</b>	<b>4.40</b>	<b>Siriraj (BKK)</b>	<b>1993</b>	<b>1.56</b>	<b>Moph (National)</b>
<b>1975</b>	<b>3.10</b>	<b>Rajvithi (BKK)</b>	<b>1994</b>	<b>1.28</b>	<b>Moph (National)</b>
<b>1979</b>	<b>3.00</b>	<b>Moph</b>	<b>1995</b>	<b>1.08</b>	<b>Moph (National)</b>
<b>1981</b>	<b>3.28</b>	<b>Siriraj (BKK)</b>	<b>1996</b>	<b>0.73</b>	<b>Moph (National)</b>
<b>1984</b>	<b>2.00</b>	<b>Chula (BKK)</b>	<b>1997</b>	<b>0.51</b>	<b>Moph (National)</b>
			<b>1998</b>	<b>0.45</b>	<b>Moph (National)</b>

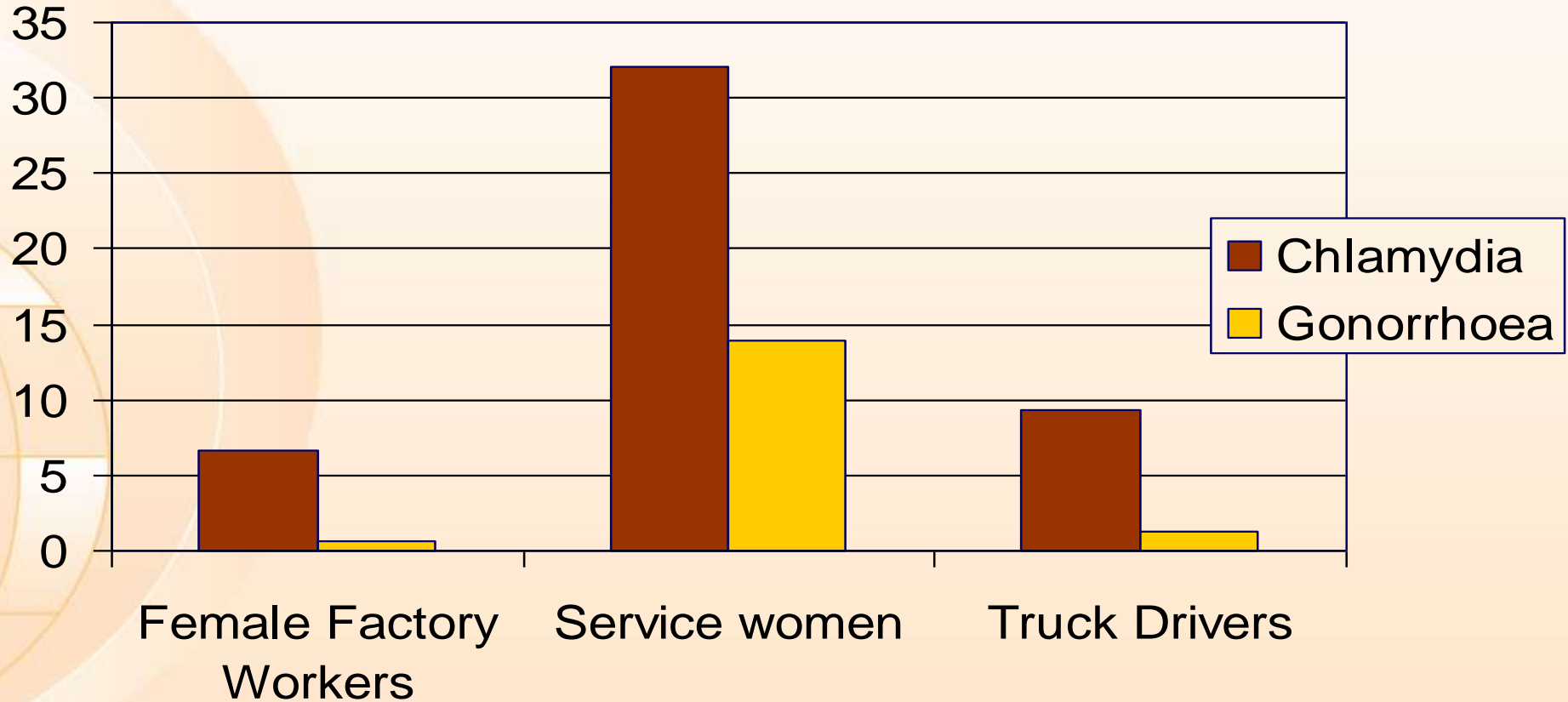
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# Prevalence of HIV and STIs in sex workers, Andhra Pradesh, Kakinada India



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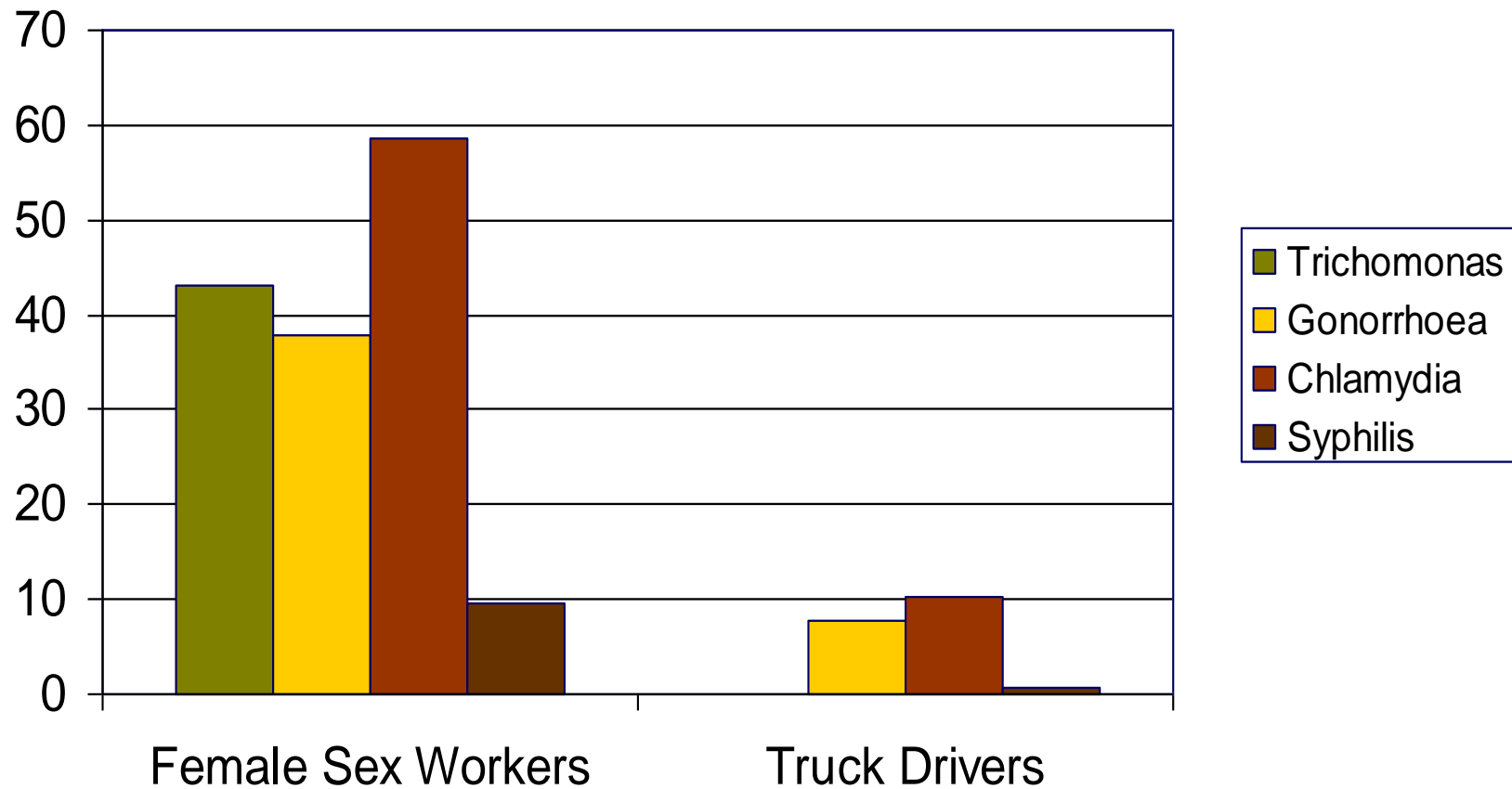
# National level prevalence assessment studies: Lao People's Democratic Republic, 2001



Adapted from: HIV Surveillance Survey (HSS) and Sexually Transmitted Infection Period Prevalence Survey (SPPS)

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# National level prevalence assessment studies: People's Republic of China, 2000



Adapted from: Prevalence survey of STIs among female Sex Workers and Truck Drivers in China 1999-2000

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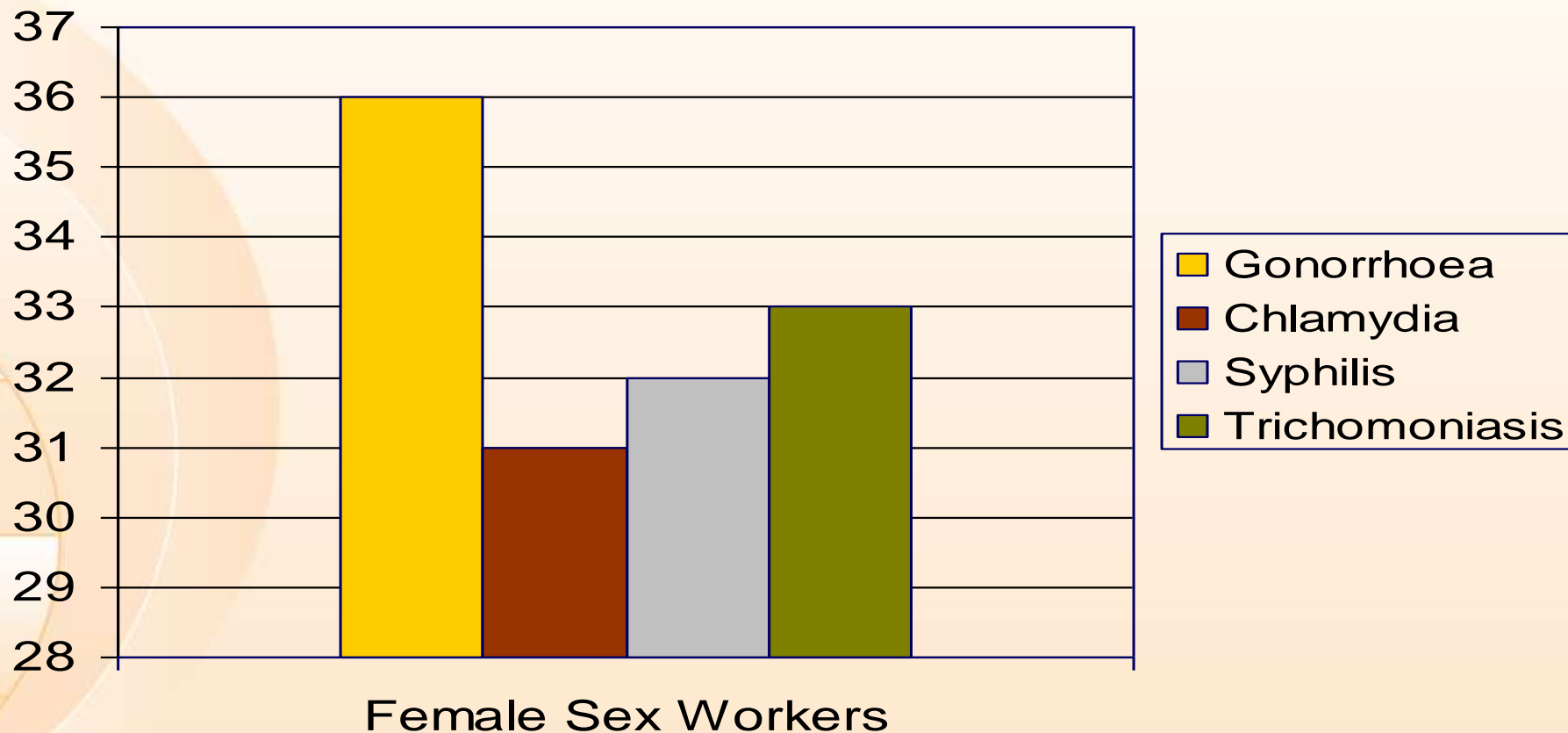
# National level prevalence assessment studies: Cambodia, 2002



Adapted from: Low prevalence of STIs in Cambodia supports recent behavioral and HIV prevalence trends, 2002

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# Cross-sectional prevalence assessment studies: Papua New Guinea, 2000



Source: Adapted from Consensus Report on STI, HIV and AIDS Epidemiology, 2000

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# Peru's Ministry of Health HIV and STD Control Programme: Community Randomized Trial, 2002.

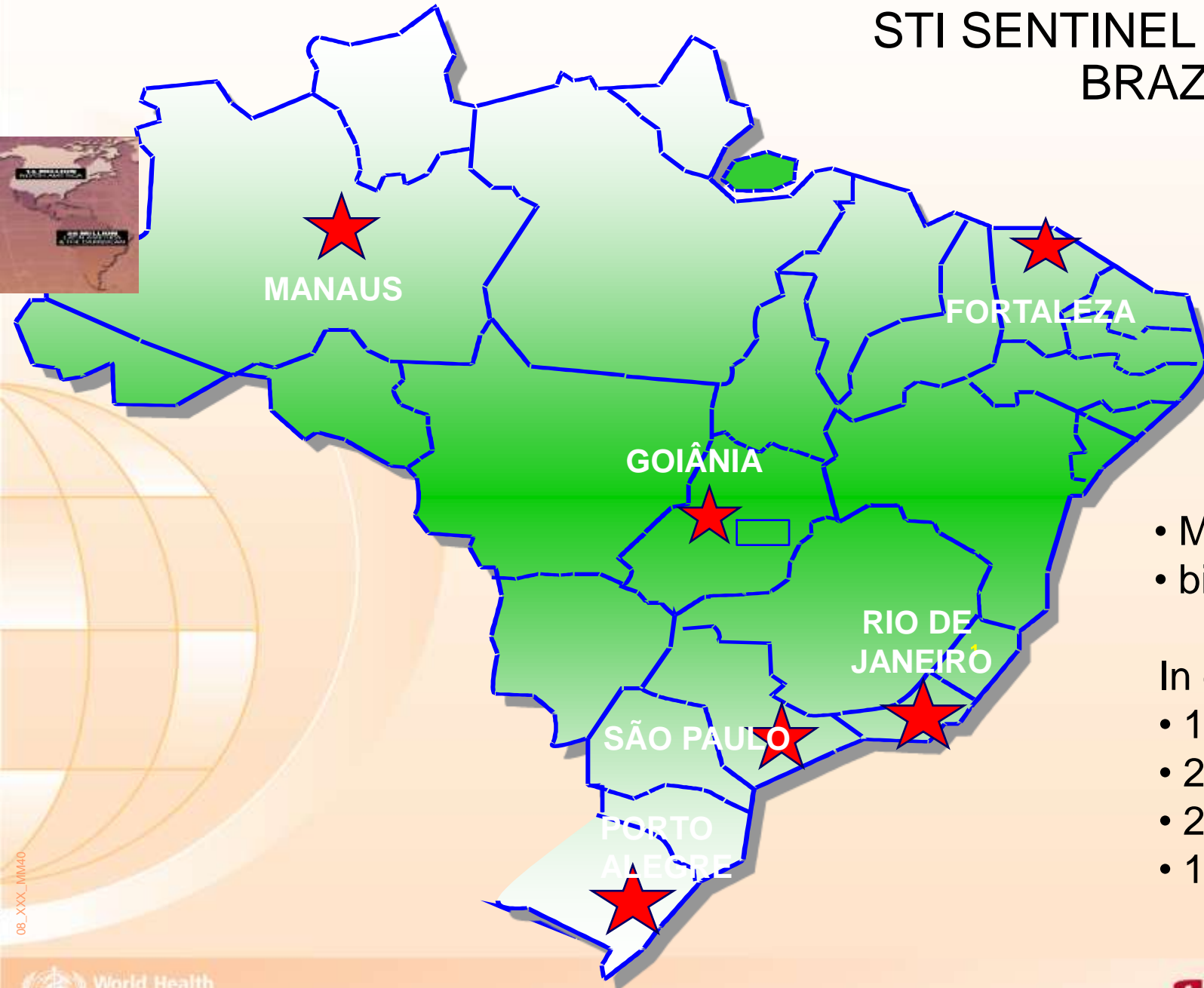


- Objective: To assess the prevalence of STD among young adults of mid-sized Peruvian cities.
- Methods: Cross-sectional survey. Household random sample of 18 to 29 year old resident of 24 Peruvian cities.
- Demographic and risk behaviour questionnaires
- STI assessed: Syphilis, HIV, Gonorrhoea and Chlamydia infection in men and women and *T. vaginalis* infection in women.
- Results:

	Chlamydia (%)		Gonorrhoea (%)		Trichomonas (%)	Syphilis (%)
	<i>Urine</i>	<i>Swabs</i>	<i>Urine</i>	<i>Swabs</i>	<i>Swabs</i>	<i>Blood</i>
Female	2.7	6.8	0.2	0.8	5.2	0-3.8
Male	4		0.3			0-3.4

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# STI SENTINEL SURVEILLANCE BRAZIL 2002



- Metropolitan areas
- biennial

In each city:

- 1 reference lab
- 2 STI clinics
- 2 antenatal clinics
- 12 a 15 industries

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# STI Estimates, Brazil 2001



STI	INCID. (%)	TOTALE NUOVE INFEZIONI	PREV. (%)	TOTALE INFEZIONI PREVALENTI
N. gonorrhoeae	1,82	1.541.800	0,71	600.600
C. trachomatis	2,32	1.967.200	1,92	1.626.600
T. vaginalis	5,10	4.326.500	3,40	2.880.700
T. pallidum	1,10	937.000	2,06	1.748.900
HSV 2	0,76	640.900	12,57	10.663.000
HPV	0,81	685.400	15,17	12.860.000
<b>TOTAL</b>		<b>10.098.800</b>		<b>30.379.800</b>

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# STI trends and risks in Eastern Mediterranean and North Africa, 2003

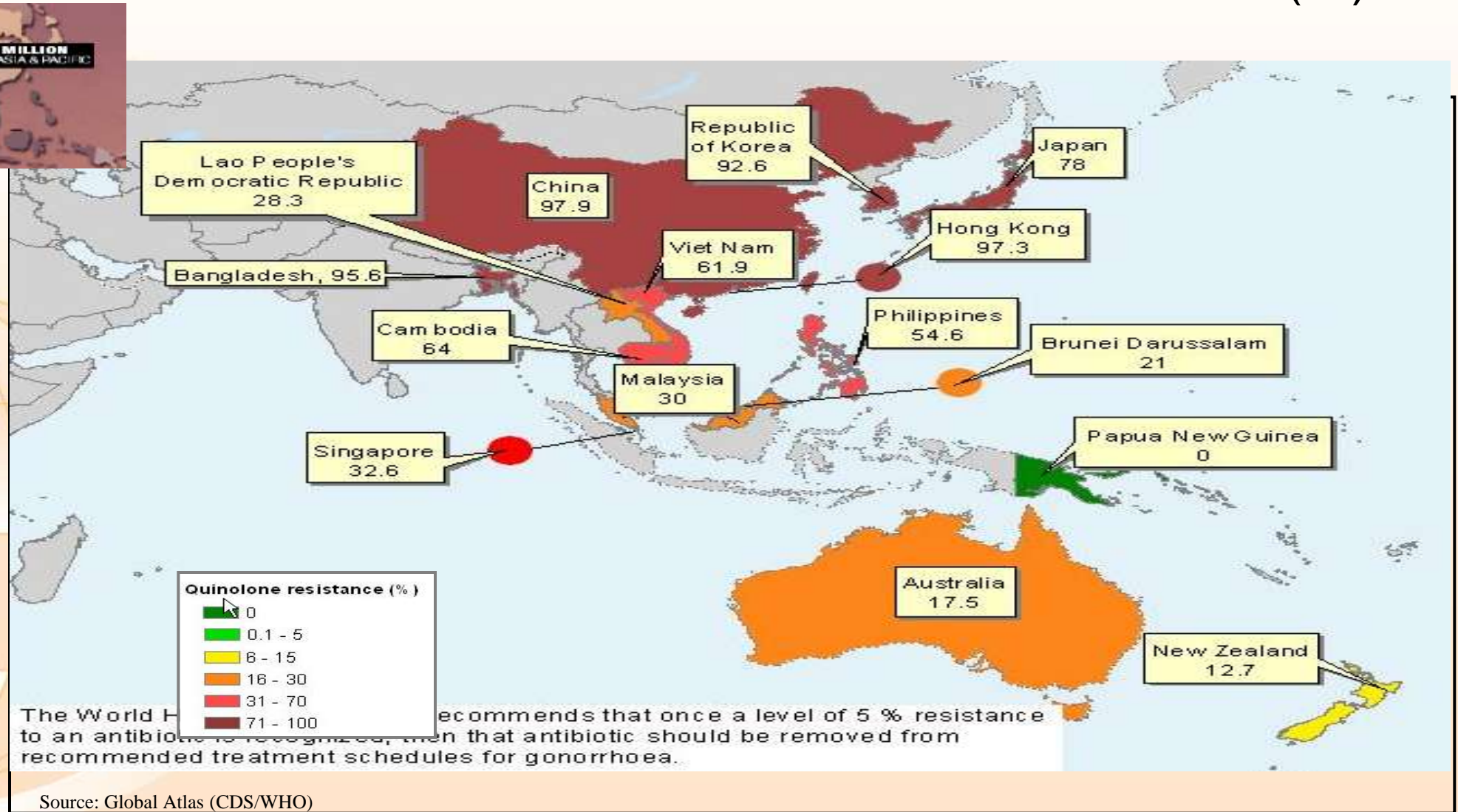


- 74 000 STIS reported in 2002 from 5 countries of the Region
- Most reported STIs are Trichomoniasis, gonorrhoea and syphilis.
- Observed increased rate of syphilis among pregnant women in Bahrain from 0.25% in 2001 to 0.35% in 2002
- In Pakistan 78% of women are reported to have vaginal pathogenic discharge, 29.4% had pelvic tenderness, 17% had cervical ulcers, 4.5% had abdominal tenderness and 2.9% had vesicles on the genitalia

Source: Abu Dhabi Meeting, July 2003

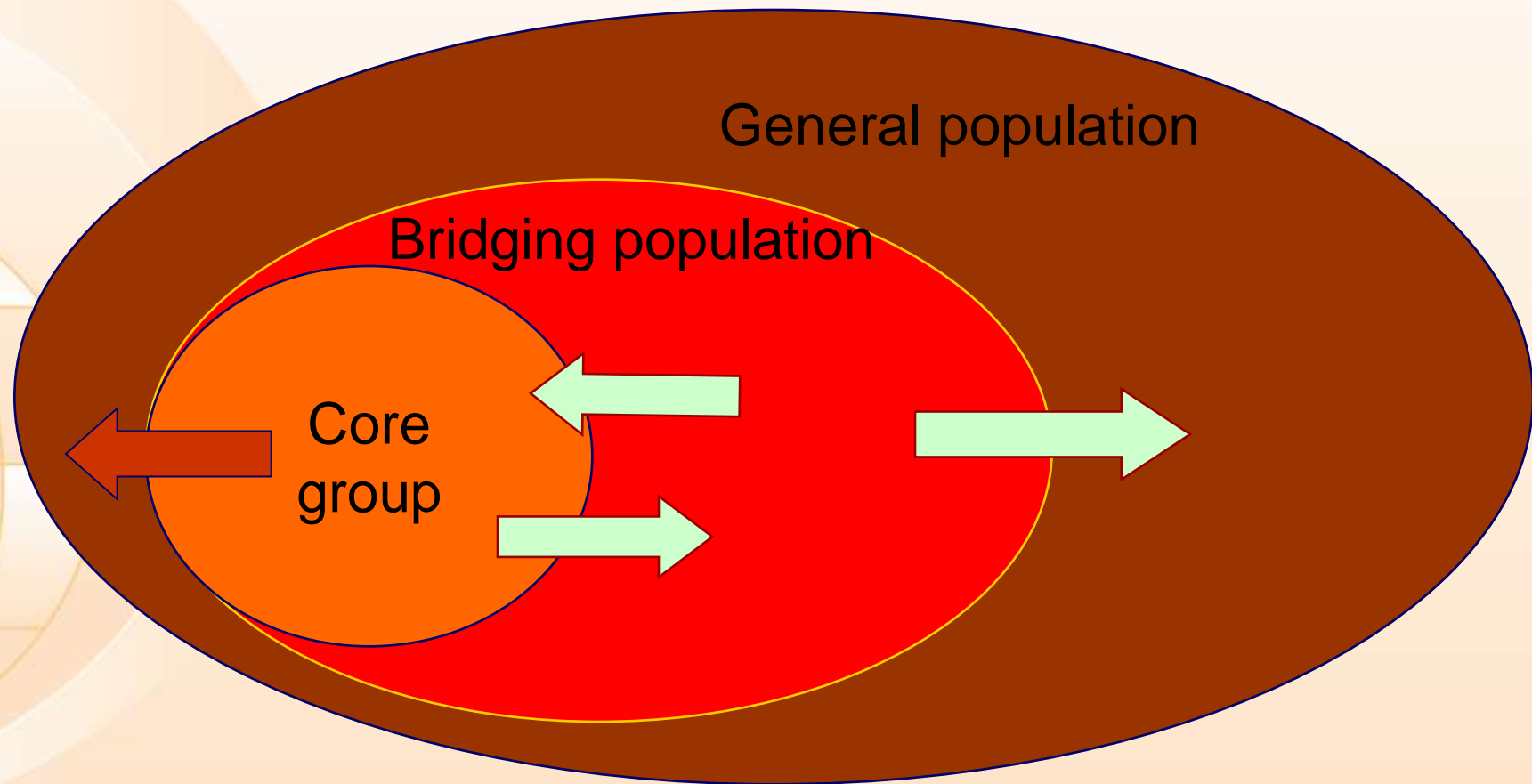
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# Antimicrobial Resistance: Quinolone resistance (%)



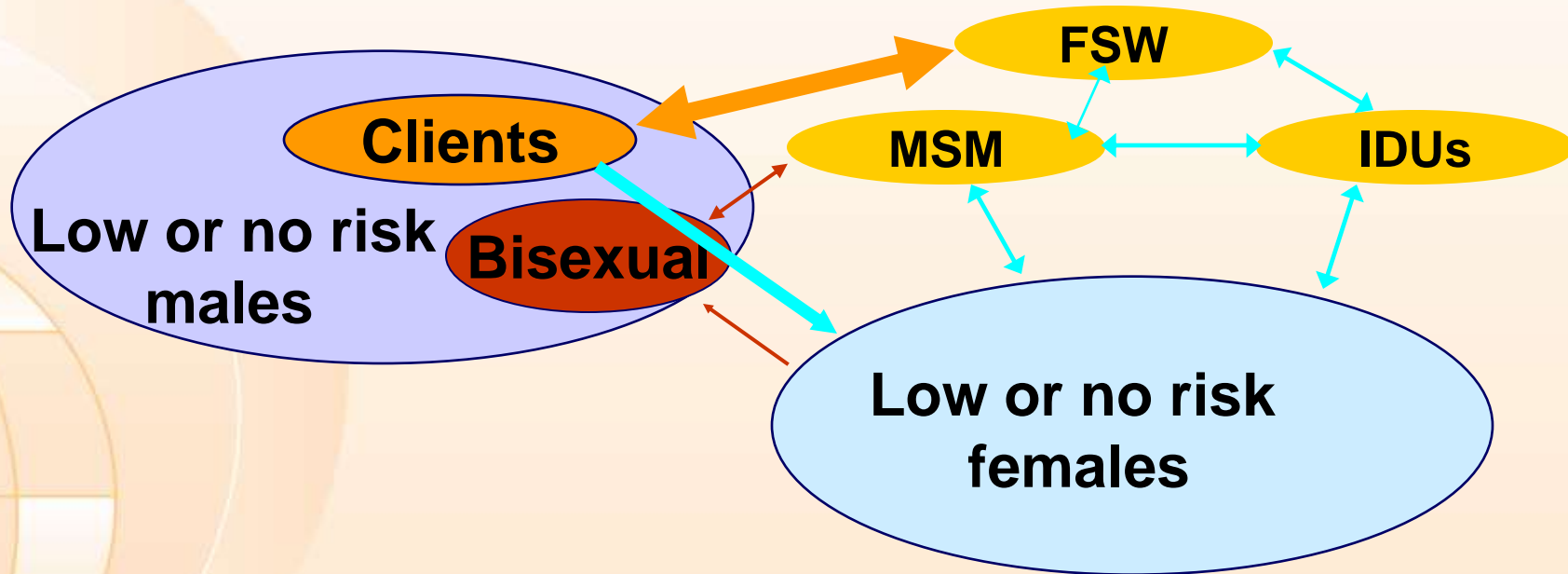
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# STI transmission dynamics at population level



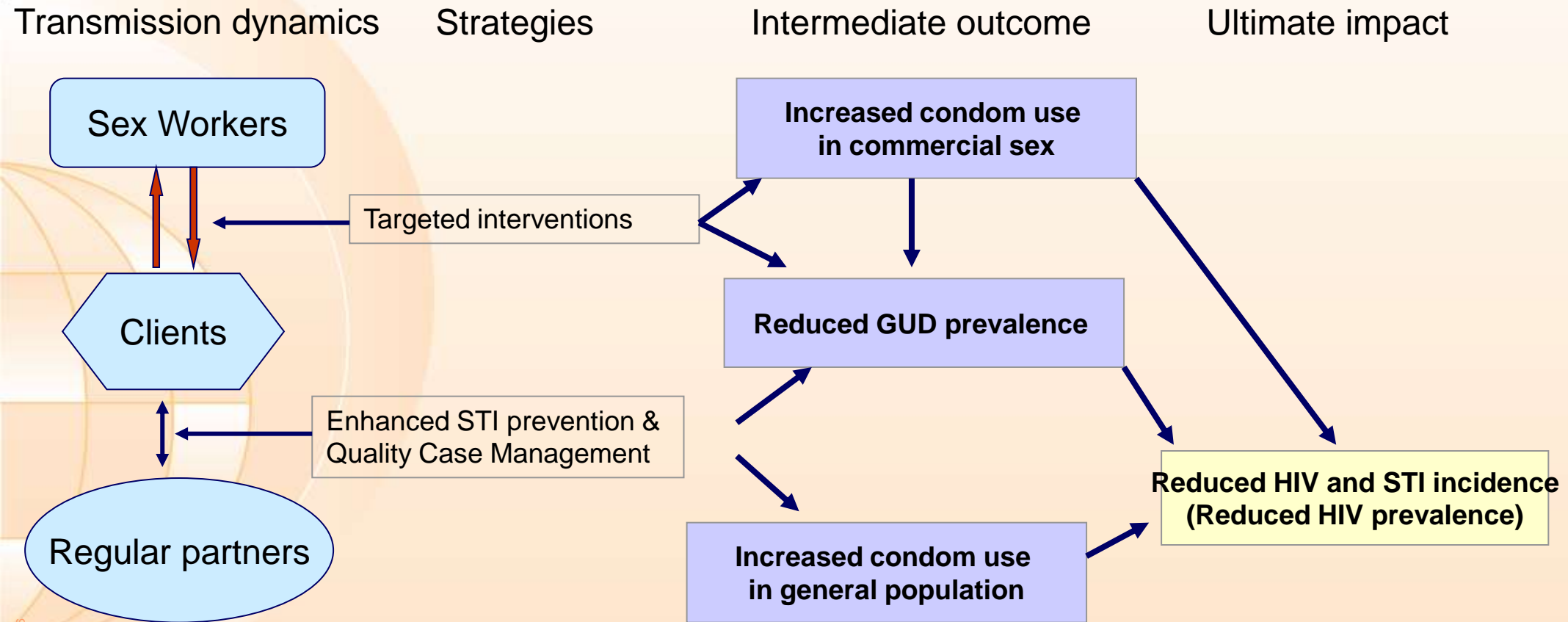
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# Dynamics within specific populations & their partners



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# Transmission dynamics model with intervention opportunities for the control of GUD and other STIs



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# Never ending story?

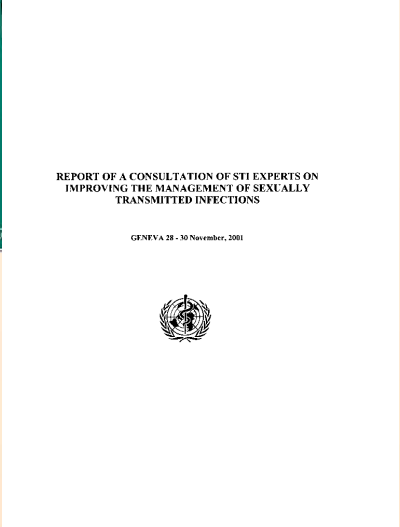
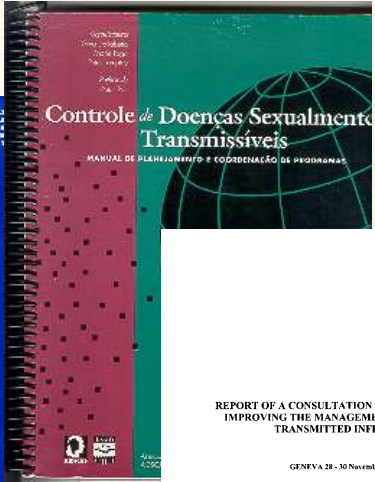
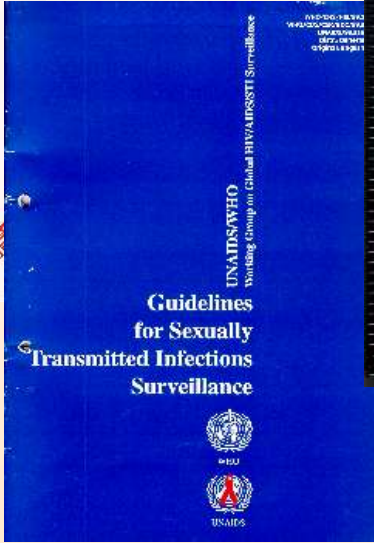
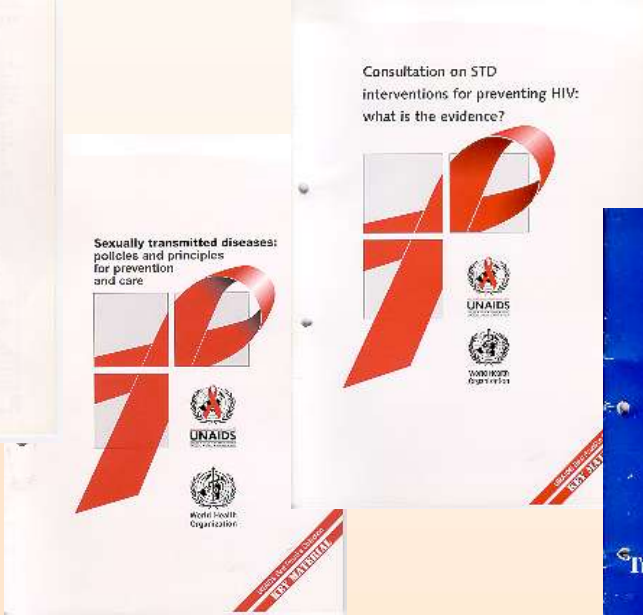
The past started



The present is working



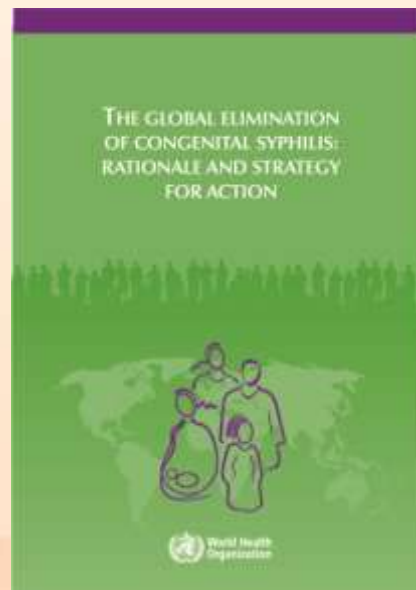
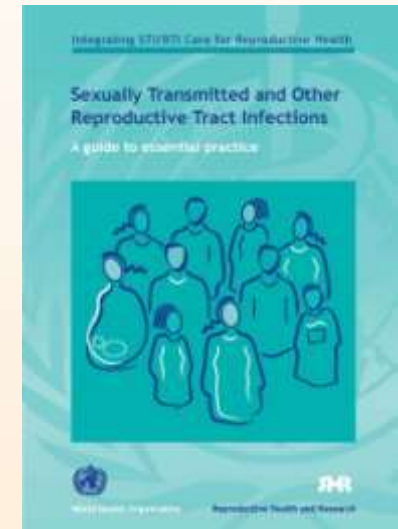
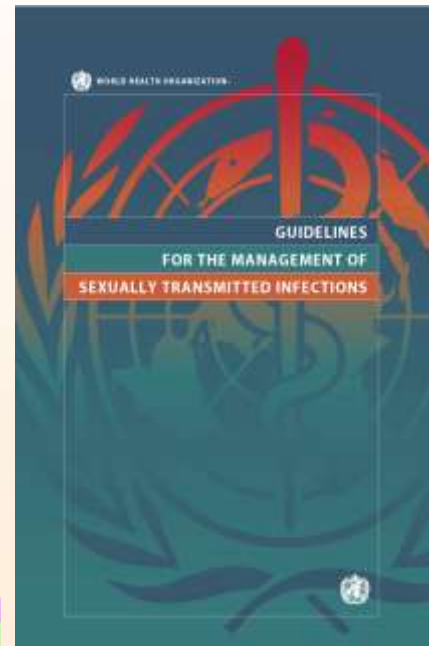
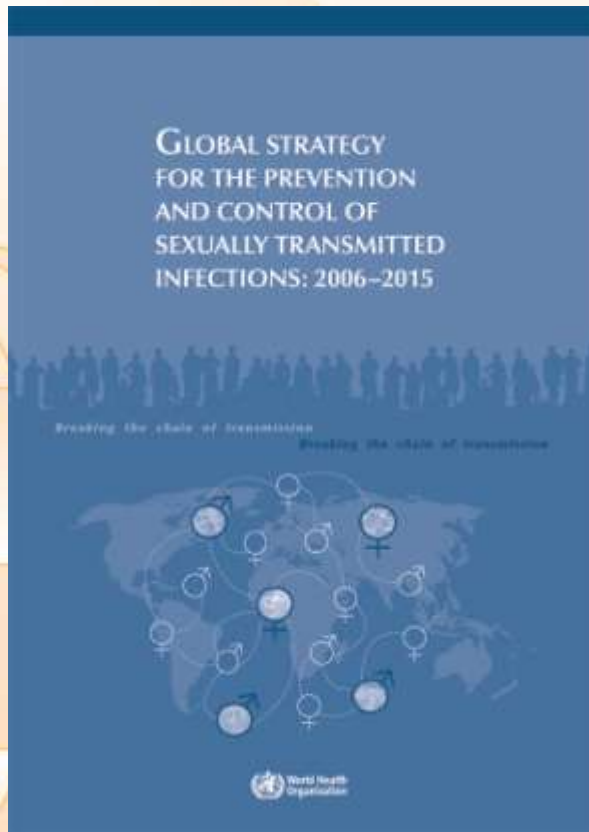
# Tradition exits



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# Progress is made



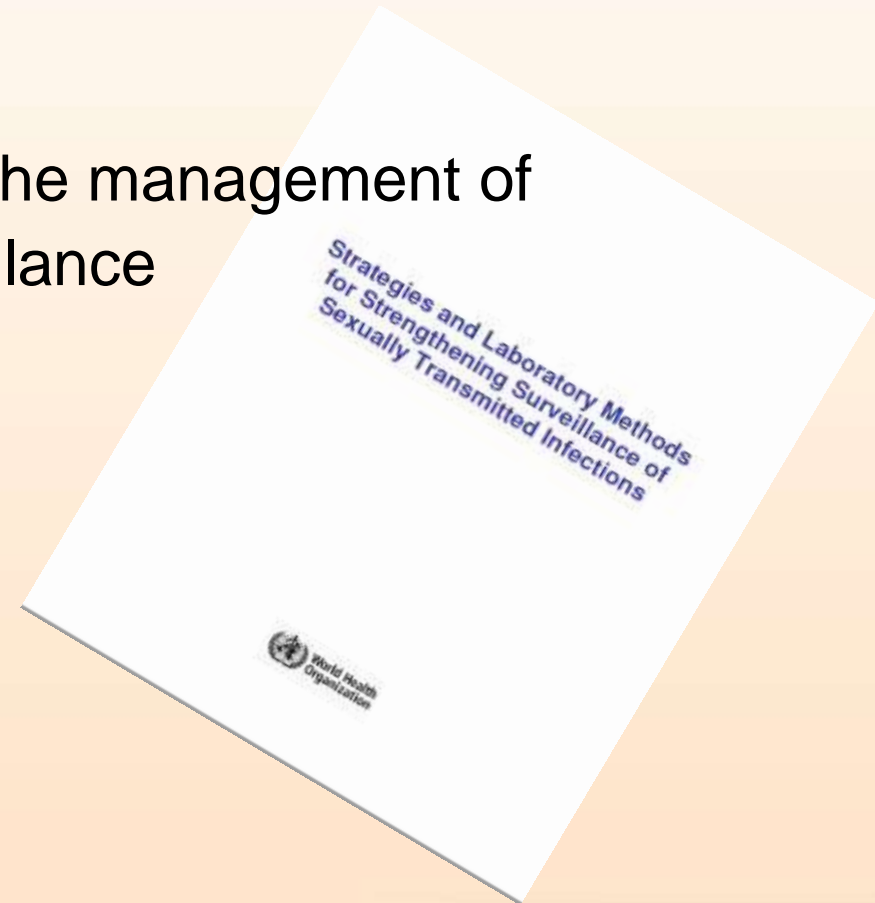
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# Coming...

- Updated version of the Guidelines for the management of Sexually Transmitted Infections
- Updated version of the Guidelines for the management of Sexually Transmitted Infections Surveillance

visit RHR at: <http://www.who.int/reproductive-health/>

visit WHO at: [www.who.int](http://www.who.int)



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